NOVEMBER 1935

WIRE AND WIRE PRODUCTS

Your customer demands quality..price..and service. Equipment is a partner with men and management in meeting these demands. If any one of the partners falls down, look out for trouble!

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THE VAUGHN MACHINERY COMPANY . . . CUYAHOGA FALLS, OHIO

COMPLETE WIRE DRAWING EQUIPMENT . . . CONTINUOUS OR SINGLE HOLE . . . FOR THE LARGEST BARS . . . FOR THE SMALLEST WIRE . . . FERROUS, NON-FERROUS MATERIALS OR THEIR ALLOYS

OFFICIAL PUBLICATION OF THE WIRE ASSOCIATION

YOUNGSTOWN

Wire Rods - Hot Rolled

Low and High Carbon
for all purposes

THE YOUNGSTOWN SHEET
AND TUBE COMPANY

Manufacturers of Carbon and Alloy Steels

General Offices - YOUNGSTOWN, OHIO

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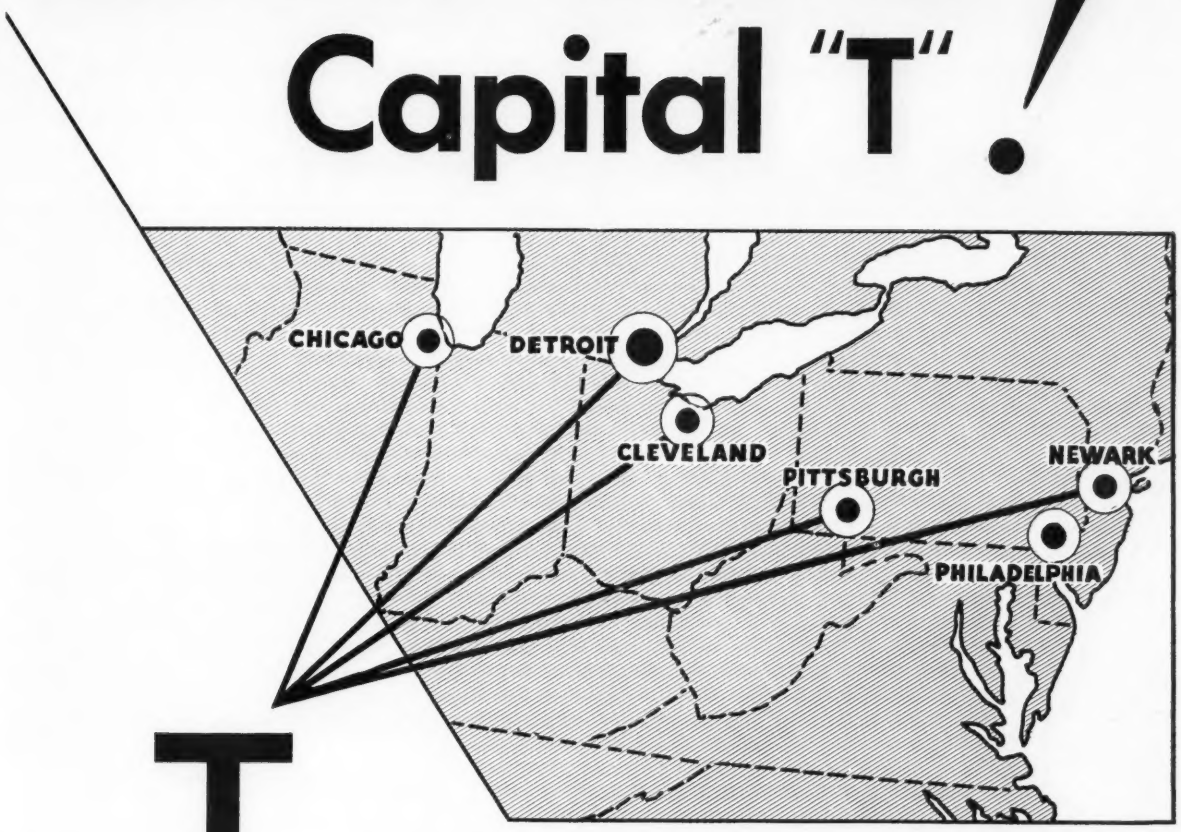
Service with a Capital "T"!



Teletype communication between our offices at Chicago, Cleveland, Detroit, Newark and Pittsburgh and our plants at Detroit and Cleveland provides facilities for the instant dispatch of your orders into our plants. Teletyping of orders cuts at least 24 hours from delivery time.

This is but a further distinctive and efficient service you receive when you order your dies through cemented carbide "headquarters".

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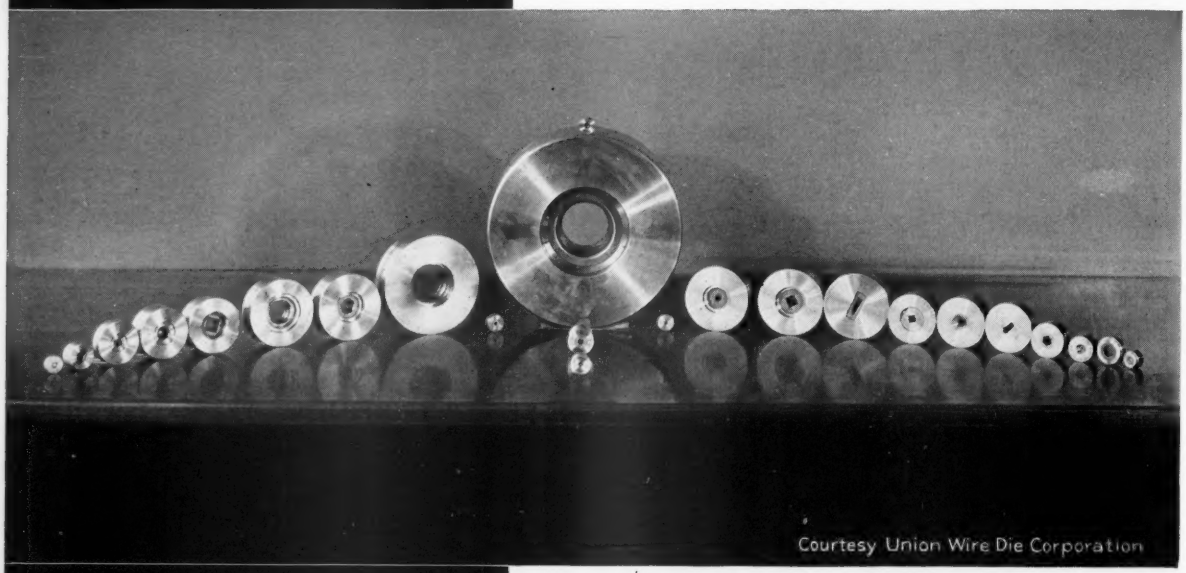
CARBOLOY SERVICE

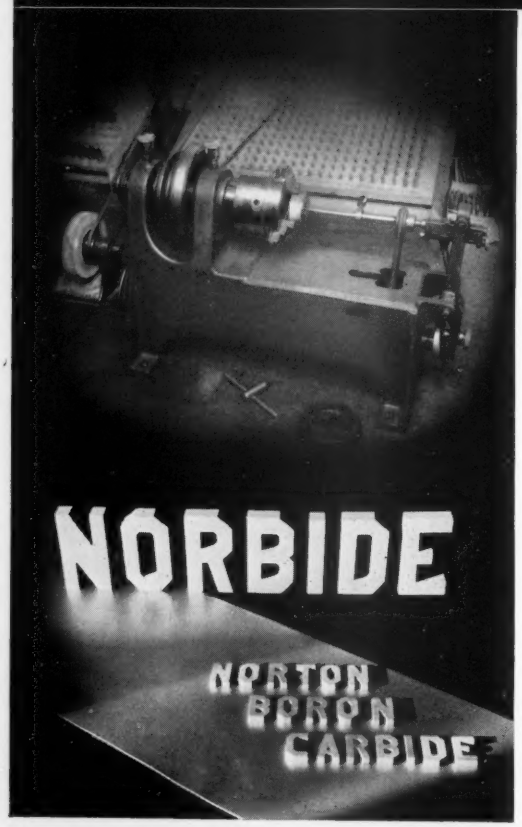
WIRE & WIRE PRODUCTS, Vol. 10, No. 11, Nov., 1935. Executive office, 17 East 42nd St., New York, N. Y. Published by the Quinn-Brown Publishing Corp., Richard E. Brown, President; R. S. Spengel, Secretary and Treasurer. Publication office, 13 West Church Street, Washington, N. J. Subscription price: U. S., $5.00; Canada, $5.60 per year, 50 cents per copy; Foreign, $7.50 per year. Entered as second class mail at the Post Office, Washington, N. J., under Act of March, 1879.

A Successful Report---

A Prominent Die Maker Economizes on Drilling and Ripping



Courtesy Union Wire Die Corporation



SINCE the introduction of Norbide Abrasive*, the Union Wire Die Corporation has employed it in their shops and has consistently recommended it to users of their dies and equipment. They report:

"In the drilling and ripping of large dies #220 Norbide abrasive grain has replaced the use of silicon carbide with great economy in time and expense.

"Number 320 F Norbide abrasive grain has eliminated the use of diamond powders in the lapping and semi-polishing operations with equal success.

"In the drilling of small dies up to the point of 'breaking through' Norbide abrasive has proved even more effective than diamond powder.

"Norbide abrasives have been used successfully in vehicles of kerosene, turpentine, cutting oils, and water treated with silicate of soda.

"The use of Norbide abrasives has reduced our consumption of crushing Bortz many thousands of carats each year."

Best results are obtained by the use of a vehicle having a consistency that will keep the abrasive in suspension. Mineral oil diluted with kerosene offers a means of varying the consistency to meet a wide range of abrasive conditions.

*Norton Boron Carbide (B_4C)

NORTON COMPANY
Worcester, Mass.

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COLD HEADING WIRE, BRIGHT, ANNEALED AND GALVANIZED, STRAIGHTENED AND CUT WIRE. MADE IN ONE OF THE MOST MODERN WIRE MILLS IN AMERICA.

WHEELING STEEL CORPORATION

WHEELING, WEST VIRGINIA

"HUDCO" PRODUCTS...
Specially Processed Copper Wire...

▲▲▲ Electrolytic and Oxygen Free ▲▲▲

WIRE---
ESPECIALLY MADE FOR METALLIZING

Pure Lead
Lead Alloy
Pure Zinc
Zinc Alloy
Copper
Tin
High Brass
Low Brass
Solder Wire
Cadmium
Nickel Silver (10%, 18%, 30%)
Aluminum
Monel Metal
Phosphor Bronze
Pure Nickel
Commercial Bronze

"HUDCO" High Conductivity Electric Wire

\+ + +

BRUSH WIRES, CRIMP and STRAIGHT
Brass, Steel, Nickel Silver, Copper and Phosphor Bronze

\+ + +

TINSEL LAHNS
Silver Plated Copper, False Gold and Copper

\+ + +

METALLIC FIBRE FOR PACKING PURPOSES
Copper, Bronze, Zinc, Lead and Aluminum

FINE BARE WIRES

High Brass
Low Brass
Zinc 99.99+ and
High Tensile Zinc
Commercial Bronze
Phosphor Bronze
Pure Tin
Lead
Antimonial Lead
Cadmium
Nickel Silver, 10%, 18% and 30%
Silver Plated Copper
False Gold and
Special Brass and
Bronze Alloys to
Specification

Winco PRODUCTS Leakproof Enameled Wire

and enameled wires in all Standard and Special Covering ▲▲▲
Made to meet the most exacting requirements ▲▲▲
THE WINSTED DIVISION OF HUDSON WIRE COMPANY, WINSTED, CONN.

We can serve you quickly and economically.
Send in your specifications for a quotation.

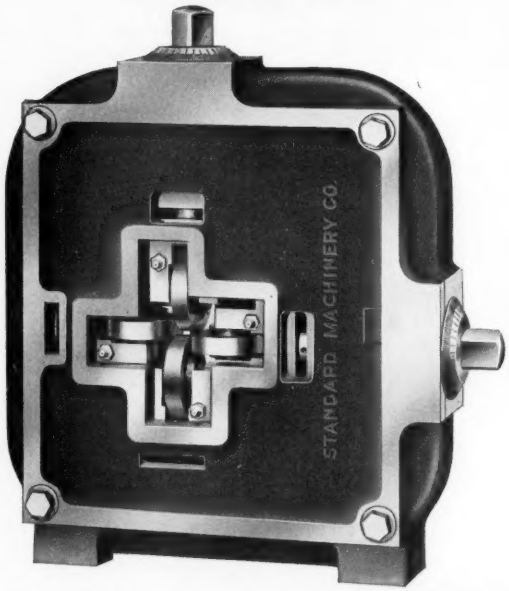
HUDSON WIRE COMPANY

Ossining, N. Y.

Estab. 1902 — Successors ROYLE & AKIN — Estab. 1902

USE A TURKS HEAD

For Irregular Shapes and Sections



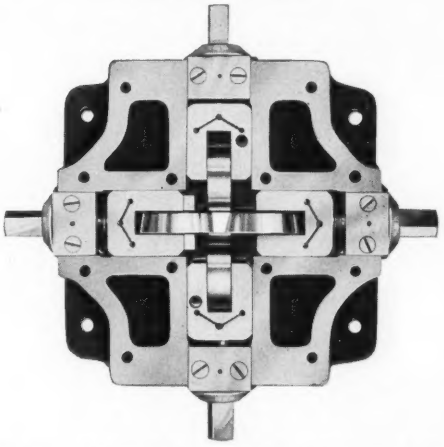
ADJUSTABLE DRAW PLATE—UNVERSAL

THE Universal Type is so named in comparison with the Plain Type because the opening for the wire can be adjusted to any size within the rated capacity, very quickly, without change of rolls, by simply turning the two square head adjusting screws shown in the cut. The adjustment is such as to obtain any square or flat within the range given. The adjusting screws are provided with graduated dials for maintaining accuracy in the drawn wire. The rolls are mounted on roller bearings, which eliminate heating of the journals and consequent distortion of the material being drawn.

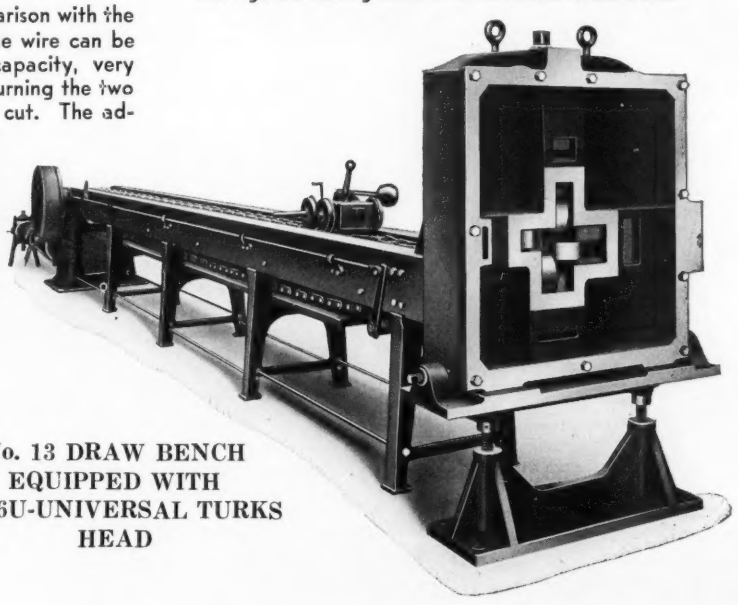
THESE Turks' Heads are great labor savers and far superior to any other tool in drawing or rolling square or flat wire. They eliminate entirely the replacement cost on worn dies, of the solid type. They are strong and durable and can be used on steel and iron as well as on the softer metals. Brackets are available for attaching them to wire drawing machines, rolling mills and draw benches. Special sizes are made to order.

THE Adjustable Draw Plates (better known as Turks Heads) of the Plain type, so named because the opening for the wire can be adjusted by four independent square head screws. The side rolls as shown in the cut are of a width of face to suit the width of stock being drawn. They may be adjusted for maintaining thickness. All four adjusting screws are provided with graduated dials for obtaining accuracy. The rolls are mounted on roller bearings, which eliminate heating of the journals and consequent distortion of the material being drawn.

ADJUSTABLE DRAW PLATE-PLAIN TYPE "TURKS HEAD"



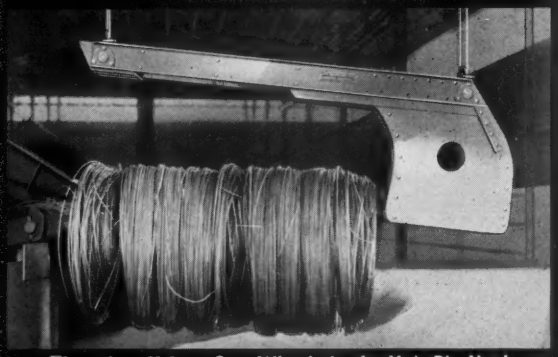
THE faces of the rolls on the Plain Type may be formed to suit irregular sections of stock. Also the rolls may be engraved so as to obtain figured designs on the drawn stock such as on the fancy wire used in jewelry or as on the figured tubing used in ornamental brass work.



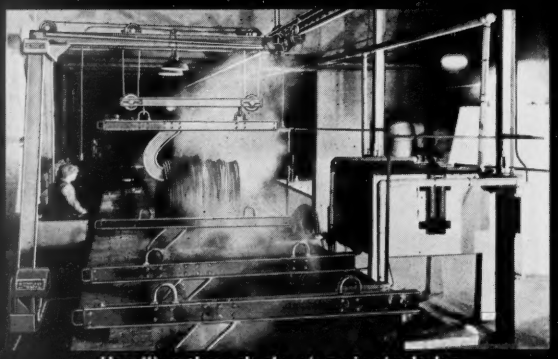
No. 13 DRAW BENCH EQUIPPED WITH No. 6U-UNIVERSAL TURKS HEAD

STANDARD MACHINERY COMPANY - PROVIDENCE, R. I.

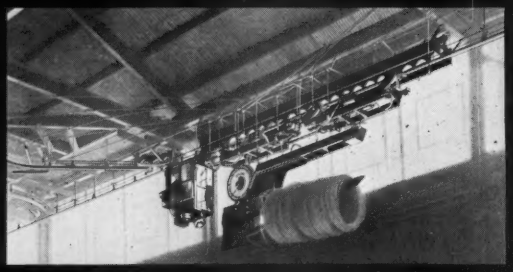
HANDLING ROD AND WIRE
THROUGH THE CLEANING PROCESSES



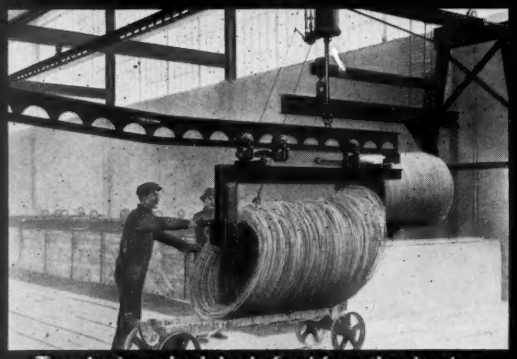
The take off from Star Wheel via the Hair Pin Hook



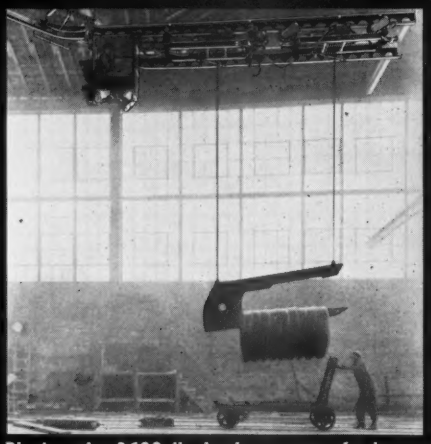
Handling through cleaning via single leg Gantry Crane



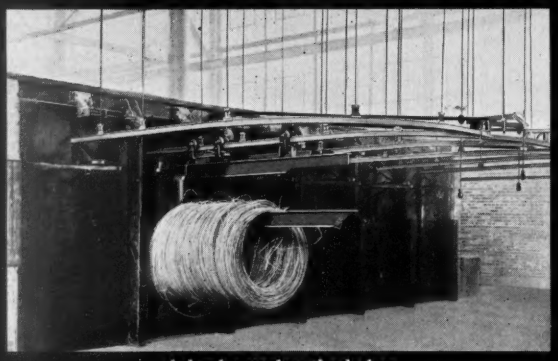
Weighing enroute to storage or cleaning



Transferring a hook load of rod from the cleaning tubs enroute to the bakers



Placing the 3600 lb. load on a transfer buggy

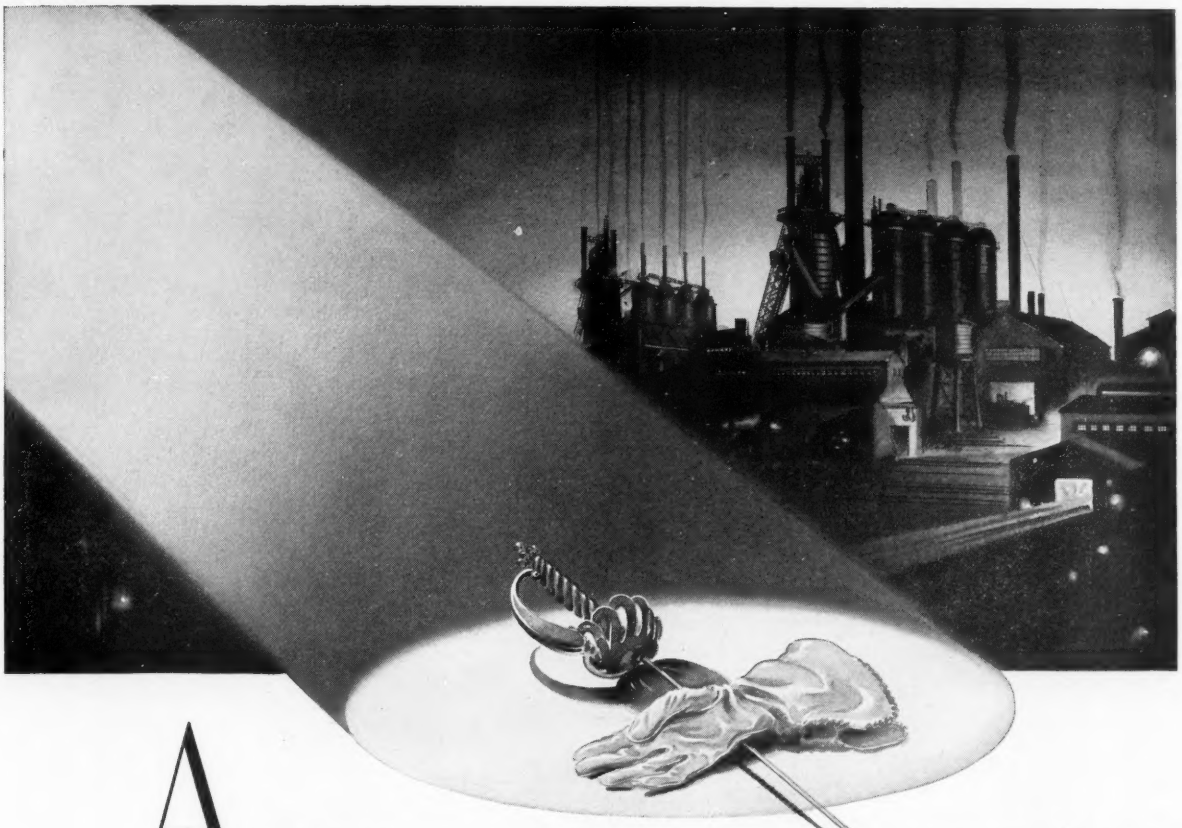


A load entering the baker

CLEVELAND TRAMRAIL

THE CLEVELAND CRANE & ENGINEERING CO.
WICKLIFFE OHIO

CLEVELAND TRAMRAIL



A GREATER REPUBLIC STEEL CORPORATION

accepts the challenge of industry . . .

With assets increased by more than $40,000,000, with greatly enlarged reserves of northern iron ores, with advantageous terminal facilities on the Great Lakes and strategically located additional plants, a greater Republic Steel Corporation accepts the challenge of every steel-using industry.

The merger of Corrigan-McKinney Steel Company and Newton Steel Company with Republic Steel Corporation is one of far-reaching significance. Corrigan-McKinney Steel Company brings to Republic tremendously increased facilities for the production of high grade pig iron and steel. Newton Steel Company has long been an important source of supply for quality sheets.

Even before the acquisition of these companies, Republic was the world's largest producer of alloy steels, including the famous Agathon line, ENDURO perfected stainless steels and the new Republic Double Strength high tensile steels that are lightening the weight of nearly every type of transportation unit. Republic has been the sole maker of rust-resisting Toncan Iron for more than 27 years—the pioneer in the development of electric resistance welded pipe—the maker of Sil-con low-loss electrical sheets and coiled strip.

In addition to making these trade-marked products, Republic continues to occupy an important place among the producers of high quality plain carbon steels in practically all commercial shapes.

A greater Republic Steel Corporation accepts the challenge of industry —looks optimistically to the future—keeps pace with the increasing demand for ever better steels—steels lighter in weight—steels of greater strength—steels more resistant to corrosion and high temperatures—steels that strike a new note in beauty—steels more dependable, longer lasting and more economical.

Republic Steel
CORPORATION
GENERAL OFFICES · · · YOUNGSTOWN, OHIO

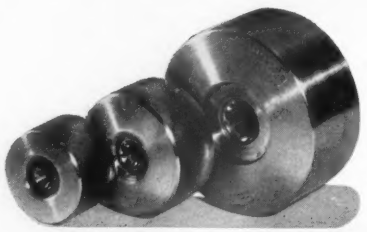
ALLOY AND CARBON STEELS
TONCAN IRON • STAINLESS STEEL
PIPE AND TUBULAR PRODUCTS
BARS AND SHAPES • PLATES
HOT AND COLD ROLLED STRIP
HOT ROLLED, COLD ROLLED
AND SPECIAL FINISH SHEETS
TIN PLATE • WIRE PRODUCTS
NUTS, BOLTS, RIVETS, ETC.
DIE ROLLED PRODUCTS

Needles for UNWIDIES

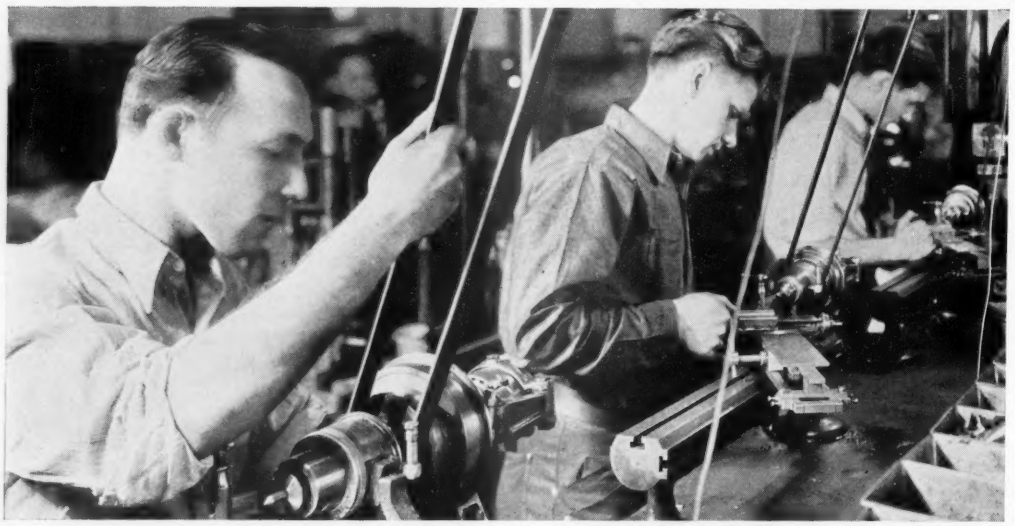
DIAMOND DIES CARBIDE DIES
UNWIDIE

Announcing the opening of our newest branch

"Not a better die but the best"



Cleveland, Ohio
214 Auditorium Bldg.



"Needles and Pins, Needles and Pins When These Aren't True Your Trouble Begins"

Literally thousands of needles are made in our shop each day to insure the accuracy of ROUGH DRILLED UNWIDIES. A true shape can only be achieved by using a needle made accurately and changed frequently. The wear resulting from use may produce a smooth die but the shape will not be what it should.

When you specify a definite shape you get it in UNWIDIES. A comparative check by a user showed that UNWIDIES alone can be depended upon for absolute shape specifications.

Little wonder that the trade is saying "NOT A BETTER DIE BUT THE BEST".

UNION WIRE DIE CORPORATION

GENERAL OFFICES -- 475 TENTH AVENUE, NEW YORK, N. Y.

Pittsburgh
Cleveland
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Trenton
Worcester
Montrouge, France

WIRE AND WIRE PRODUCTS

A monthly publication devoted to the production of Wire, Rod and Strip Wire Products and Insulated Wire and Cable

DRAWING—ROLLING—EXTRUDING—FORMING—FABRICATING

Vol. 10 November 1935 No. 11

Designated as

Official Publication By The Wire Association

Contents

Wire Association Meeting—1935 507

Oxygen-Free Copper . . . . . By Henry M. Schleicher 514

A discussion of the paper by R. A. Schatzel, Superintendent, General Research Laboratories, General Cable Corporation, Rome, N. Y., entitled "Hard and Soft Copper Wire" as presented before the Wire Association.

Material Handling of Rods and Wire . . . . . By Frederick A. Westphal 516

A study of material handling layout for wire mills presented in the form of a lecture before the Wire Association at Chicago, Illinois, on October 1, 1935 and being the second part of a paper entitled "Acid Cleaning and Material Handling of Rods and Wire". Part I relating to acid cleaning methods was published in the September, 1935 issue of WIRE AND WIRE PRODUCTS.

Industrial Relations as Applied to the Wire Industry . . . . . By E. W. Kempton 518

A study of industrial relations in the wire industry based on a questionnaire sent to the industry and presented as an address before the Wire Association.

How to Order Wire . . . . . By J. Kenneth Murray 524

An address delivered before the Wire Association at Chicago on October 3, 1935, outlining some principles for ordering wire which, if followed by customers, would facilitate the production and delivery of the specified type of wire desired.

Outstanding Personalities of the Wire Industry 526

A Review of Recent Wire Patents 528

Exports and Imports of Wire 529

'Round the World With the Wire Industry 531

Amaloy — A New Lubricant 540

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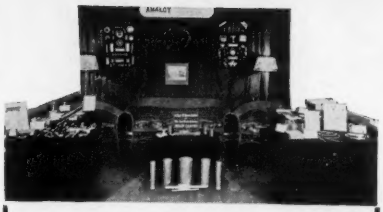

AMALOY BOOTH AT THE NATIONAL METAL EXPOSITION

Can You Draw Stainless Steel Rod From .281" Dia. to .020" Dia. With Only One Annealing ?

You can by using

AMALOY

as a lubricant—
and also increase
the life of your dies.

WHY NOT INVESTIGATE?

Write for information regarding this time and labor saving operation.

::

Amaloy can also be used as a substitute for pure tin coating on rubber insulated copper conductors with better results at a fraction of the cost of tin.

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511 Fifth Avenue, N. Y. C.

Factory
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Brooklyn, N. Y.

2,500,000 Lbs. of Wire

AND STILL IN SERVICE

GAUGE	WEIGHT DRAWN Pounds
14½	94,330
14	* 69,770
13	93,350
12½	110,930
12	127,415
11½	* 64,220
11	131,755
10½	* 67,105
10	91,335
9½	* 59,130
8½	381,910
8	439,025
7½	460,355
7	347,370

*Recut before dies went off size.

After drawing over 2,500,000 pounds of wire they are still in service.

Only big figures describe the performance of Firthaloy Wire Drawing Dies. The two dies shown were put into service drawing low carbon wire on April 19th, 1934, and they are still going. They were "ringed" so little and worn so slightly that they were used for practically all the split gauges on the way up, as shown by the figures reported.

FIRTHALOY

Decide now to investigate Firtheld Cased Firthaloy Wire Drawing Dies. See for yourself how this Firtheld Cased principle supports the nib and holds it absolutely tight against all stresses set-up by the drawing operations. Watch the Firthaloy Firtheld Cased Dies after the many recuts and then you will know why Firtheld Cased Dies are giving better performance.

FIRTHALOY

A test in your own mill will tell the story. Make the trial and you will agree that Firtheld Cased Firthaloy Wire Drawing Dies deserves a place in your mill.

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NEW YORK CHICAGO
HARTFORD CLEVELAND
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PHILADELPHIA
GLOBE WIRE DIVISION
McKEESPORT, PA.

WIRE AND WIRE PRODUCTS

A monthly publication devoted to the production of Wire, Rod and Strip.
Wire Products and Insulated Wire and Cable.
DRAWING --- ROLLING--- EXTRUDING --- FORMING --- FABRICATING

Vol. 10 NOVEMBER 1935 No. 11

Wire Association Meetings And Technical Sessions

A concise report of the discussions held in connection with the papers presented before the Wire Association Meetings at Chicago, Illinois, September 30th—October 4th, 1935 inclusive, together with a report of the Annual Meeting of the Directors of the Wire Association and the Annual Meeting of the Association. ✦ ✦ ✦

THE technical sessions held October 1, 2 and 3 marked a new high for the Wire Association in attendance, in the character of the papers, and in the value and vigor of the discussion. For the first time since the present discussion form of meeting was inaugurated in 1932, the discussion arising directly out of the papers was so lively and interesting that it was impossible to introduce other topics sent in for discussion and questions from the membership at large. All sessions ran late and broke up reluctantly.

✦ ✦ ✦

THE sessions devoted particularly to steel ran from 9:30 to about 12:30 each day. Mr. John Mordica, Superintendent, Rod and Wire Mill, Bethlehem Steel Co., Sparrows Point, Md., President of the Association, in his opening address said:

Gentlemen:

In extending my greetings to you at this year's meeting, I do so under conditions very different from those existing last year at this time. On every hand we now have evidence of improved business. This evidence is in the form of increased orders and increased production in practically all branches of the wire industry. Further all reports from the various economic research bureaus indicate that business is once more on the up-grade and that the country is on the verge of a general business revival.

In opening last year's meeting I made the comment that despite the generally uncertain business conditions existing at that time, the Wire Association had come through the depression in very good shape.

JOHN MORDICA
Supt., Rod and Wire Works, Bethlehem Steel Company, Sparrows Point, Md. President, the Wire Association.

Continuing this thought, it is interesting to note that our Association shows an increase of 35 members since the last meeting and that the financial condition has slowly but steadily improved. Five years ago when our Association was first organized, some of the old-timers in the wire industry predicted that it would die a quick and natural death. In going over the short history of what we have done, I think that we can point with pride to a record of accomplishment equalled by very few technical associations during the same period.

Through the meetings of our Association, we have developed a spirit of friendliness and cooperation among our members, we have succeeded in successfully aiding a great many of our members with their technical problems, and we have established and developed a much higher standard of technical research in our industry than heretofore existed. This is evidenced once again in the character of the papers presented at our meetings this year, and I want to take this occasion to extend my compliments both to the Program Committee and to the authors of the various research papers for the very fine work done.

If we have accomplished nothing else, these facts in themselves not only justify the existence and work of this Association, but serve to indicate that in the years to come our activities will become more and more a vital factor to the success of our industry. Our job is not only to assist each other in developing pro-

duction processes, but to educate and direct the opinion of those engaged in our industry for its betterment as a whole. Let us continue to work together during the coming year as we have in the past, and we will make long strides toward the accomplishment of this objective.

✦ ✦ ✦

PRESIDENT **Mordica** then introduced **Mr. Callaghan,** chairman of the program committee, who promptly introduced **Mr. Moritz** as chairman of the session.

✦ ✦ ✦

AT the opening session on Tuesday morning **Mr. Westphal's** paper on cleaning was supplemented by slides and running comment on mechanical handling throughout the wire mill. It was followed by **Mr. Hoover's** paper on rubber-lined pickling tubs, and as the two subjects were essentially the same, the discussion ranged quite generally over types of construction for permanent tubs. Concrete shells, all-brick tubs, and rubber lined steel tubs with brick lining each found defenders. Vitrified paving brick bonded with Basolit seemed generally favored, with much difference of opinion as to the outer shell. Types of outlet also came in for considerable discussion. **Messrs. Hoover, Westphal, Mordica, Neuhaus, Whyte and Cochran** were active in the discussion.

✦ ✦ ✦

THERE was some discussion as to acidity and temperature, and procedure regarding acid additions.

✦ ✦ ✦

IN Wednesday morning's session, under the leadership of **Chairman Callaghan,** the Association discussed Inherent Grain Size.

✦ ✦ ✦

MR. **McCarthy's** noteworthy paper, which was pretty well understood to have won the Wire Association Award for the year, was not read, but the author in summarizing it managed not only to clarify the whole subject but to open up new vistas in this increasingly interesting and important subject.

✦ ✦ ✦

THE discussion was very lively and it was indeed difficult for the chairman to bring the session

E. W. CLARK
Mechanical Engineer, Wire and Cable Section, General Electric Co., Schenectady, N. Y., Vice President the Wire Association.

to a close. It was brought out that coarse grained normal steel, the type most suitable for the general run of wire products, is by no means a new product nor one difficult and expensive to make. It is neither more nor less than first class, clean, carefully worked, well deoxidized steel, refined with the care which all steel deserves but which steel for wire mill use has not always received. Forging steels and other exacting steel products have long been of this class, but the impression has long been current that for the wire mill less care was necessary. There is nothing new about the steel—what is new is a very simple and effective way of discovering, at any stage in wire manufacture from the test ladle to the finished product, whether the steel mill has actually done a good job. It is a method of determining why all heats are not as good as the best heat.

L. D. GRANGER
Asst. to Vice President, Wickwire Spencer Steel Co., Vice President the Wire Association.

WHILE normal coarse grain is most suitable for general wire purposes, there are some specialties, notably steel to be oil tempered, in which other grains are preferred. Fine grained steels are especially good in resisting fatigue. Fine grain is developed by deoxidizing in the open hearth furnace not completely but to a predetermined point, leaving some work to be done in the ladle and the ingot mold so that the great numbers of oxide particles thus freed may form nuclei and induce grain growth simultaneously at many points. For the general run of wire products, coarse or fine normal steels are equally good. Coarse grain is likely to be more uniform, and to give better results when submitted to many drafts, and is preferable usually for steel to be patented.

✦ ✦ ✦

THIS paper and discussion are the most fruitful things that have yet come out of the work of the Wire Association. **Mr. McCarthy** was warmly thanked by the chairman and by the attending members, and the **Wickwire Spencer Steel Corp.** was officially thanked for cooperating in bringing the matter before the public. The award of the Association Medal to **Mr. McCarthy** which took place at the banquet, Wednesday evening, was the occasion of another demonstration of the feeling of the membership regarding this noble contribution.

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THE discussion was quite general, and **Mr. McCarthy** did not have things all his own way. His statement that the Swedes had worked out the theory and practice of making clean coarse grained normal steel was disputed by **Mr. Lewis,** who contended that the Swedes never faced the conditions which make for over-oxidized steel, since their pig carries practically no phosphorus or sulphur and they are not forced to endanger the cleanness of their steel by attempting the removal of these elements with a highly oxidizing slag, a low carbon content and a high temperature. There was some discussion

of the technique of the **McQuaid-Ehn** test, following questions by **Mr. Dove.**

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DR. **Braley** having mentioned the dangerous word "sorbite", there was some discussion of recent work on the subject. It appears that while there is a definite structure known as Sorbite, resulting from a temper after a quench, it cannot be resolved into pearlite, and that in the succeeding structures resulting from the cooling of austenite it has been definitely proved that there is no sorbite.

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THE higher magnifications now available show the patented structure to be an extremely fine pearlite. The opinion was expressed that the wire industry needs a name for this particular grade of pearlite and that if "sorbite" is to be dropped, it would be to the interest of this Association to find a suitable name quickly before some other body, whose interest in the subject was purely academic, fastened some unwieldy name on the structure.

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WEDNESDAY evening the first annual dinner of the Wire Association took place, and it was a great success from every viewpoint.

MR. **E. W. Kempton,** Director of Industrial Relations, American Steel & Wire Company, delivered an address on the subject of "Industrial Relations As Applied to the Wire Industry", which is published elsewhere in this issue. After Mr. Kempton's address, the outstanding event of the Convention occurred—the award of the Wire Association Medal.

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THIS was presented to **Benjamin Lewis McCarthy,** Metallurgist, of the Wickwire Spencer Steel Company, Buffalo, N. Y., "for the most meritorious paper on wire manufacture or fabrication presented during the year".

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THE presentation was made by **Mr. John C. Callaghan,** Works Manager, Canada Works, Steel Company of Canada, Ltd., Chairman of the Program Committee, who said in making the award:

"Mr. Chairman and gentlemen: Before I perform the pleasant duty that I have been called upon to perform, I wish to make a brief reference to the work of the Program Committee. The co-operation, which was given us by the various members who were asked to take on the task of preparing papers on the subjects which we believed would be of interest to the members of the Association, made the work of the Program Committee very simple. Next year the same hearty response from individuals asked to contribute will be expected when the new Program Committee starts about their task of lining up the subjects and speakers. The hearty co-operation of the membership of the Wire Association augurs well for the future.

I wish to make special reference to the paper by Mr. Kempton, Director of Industrial Relations, of the American Steel and Wire. I could quite easily appreciate the thoughts that I knew were going through Mr. Kempton's mind as he was eating his dinner, sensing quite readily that there was a light gay note to the proceedings, and no particularly serious thought in the minds of those present, and I was inclined to think that his paper was going to be somewhat out of place, and perhaps not well received. I want to congratulate you all on the way you could snap out of the frivolous and settle down to listening to a very thoughtful, constructive paper on a subject that concerns us all, and on which we are looking for all the constructive guidance and information that can be obtained. I am sure Mr. Kempton could not have asked for a better hearing and I trust he will take back to Mr. Blackmer our appreciation of the part that the American Steel and Wire took in our proceedings, and I trust we will have Mr. Blackmer's continued and increasing interest in the work of this wire association.

It is my pleasure and privilege to make reference to the awards which are to be made for the outstanding contributions to this year's Convention proceedings. The Committee carefully reviewed the various papers, and they wish to state that the standard was high. While we have only one medal to award for the outstanding contribution, yet there were two that deserve special mention. They are "Hard and Soft Copper Wire" by Rudolph A. Schatzel, Superintendent, General Research Laboratories, General Cable Corporation, and "Cold Heading Wire" by Leroy D. Seymour, Metallurgist, Rod and Wire Department, Youngstown Sheet and Tube Company, and the Secretary of the Wire Association is herewith instructed to have certificates engrossed and forwarded to these authors at the earliest possible moment.

While the committee take a real responsibility in deciding upon the relative merit, yet they felt that in the decision made this year in awarding the medal to Mr. McCarthy, of the Wickwire Spencer Steel Co., for his paper on 'Grain Size and Its Influence on the Manufacture of Steel Wire', we would be reflecting the minds of the members present, and before formally making this award to Mr. McCarthy, I would like to have some show of your approval of this as confirmation (loud applause). Mr. McCarthy, it gives me great pleasure on behalf of the Wire Association to present you with this bronze medal, a token of our recognition of the outstanding character and value of your contribution to the Wire Association."

BENJAMIN LEWIS McCARTHY
Awarded the Wire Association Medal for the most meritorious paper on wire manufacture or fabrication during the year.

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MR. **McCarthy** expressed his appreciation of the honor in a few well-chosen words, after which **Mr. Kenneth B. Lewis,** Chairman of the meeting, announced that the entertainment feature of the dinner would follow.

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AN interesting entertainment arranged by the Dinner Committee, consisting of **Mr. Walter Richards,** Chicago, **Mr. A. R. Zapp,** Firth-Sterling Steel Co., and **Mr. R. L. Hamaker,** American Lime & Stone Co., followed, and at the conclusion of the meeting, it was voted a big success and that it should be repeated at next year's convention.

THURSDAY morning's session, conducted by **Mr. Simmons,** considered Cold Heading, discussing an excellent paper by **Leroy Seymour** on the subject. **Mr. Seymour** answered numerous questions on the subject, many of a distinctly practical nature.

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RIMMED steel, which is coarse grained abnormal, is the favorite material for cold headed products except for those which are heat treated for special properties. Oil and water quenching require different types of steel.

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MR. **Seymour's** slides and tables were excellent. The discussion ranged over so much ground that it can scarcely be summarized.

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THE same is true of the second paper, that of **Mr. Kellogg** on testing. While the paper was general in character, the questions it provoked were specific and quite varied.

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Non-Ferrous Sessions

TUESDAY afternoon under Chairman **Paul Fast, Mr. Schatzel's** paper was summarized by **Mr. Pirk** and was discussed at considerable length. The crystal structure of wire bars came in for considerable notice, **Mr. Sidney Rolle** presenting the case for oxygen free as against tough-pitch copper. It was brought out that copper containing oxides was likely to suffer when heated in hydrogen, or in some of the bright annealing atmospheres, the oxides upon reduction leaving voids which resulted in brittleness. This might be significant in cases of gas welding.

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MR. **MUELLER'S** paper on the influence of back-pull in wire drawing raised a long and lively series of arguments, in which **Messrs. Pirk, Salmon, Lewis,** and **Clark** were involved. **Mr. Lewis** reminded the members that he had presented a paper on this subject in 1933, which apparently fell on deafer ears than the present paper. While agreeing with **Mr. Mueller** in the main, he challenged some of his methods of proof, and particularly objected to the contention that each zone of contact in the cone pre-stresses the wire in succeeding zones, and to **Mr. Mueller's** belief that this accounted for the power savings in heavy drafting. He had other explanations for the phenomena.

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IT was generally agreed that the back-pull may result in considerable power savings in copper wire drawing, but it was suggested that the same savings might be got in other ways. **Mr. Lewis** maintained that although **Mr. Mueller's** laboratory work showed the soundness of the back-pull theories, his mill demonstrations were far from conclusive. There was general agreement however that better die life was a distinct possibility, as well as a better finish and perhaps somewhat different physical properties. **Mr. Mueller** pointed out that if die pressures could be drastically reduced it might be possible to get into a zone in which coefficient of friction would drop to the values more common in bearing lubrication, which would almost certainly have surprising results.

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WEDNESDAY afternoon **Mr. Clark** presided over a session which was occupied by discussion of **Messrs. Barker and Bailey's** paper on effect of grain size on bending properties of copper wire. What chiefly developed was the fact that there is a desirable property of wire for which no standard test has been developed, namely the property of taking a dead set when bent. This is important in winding coils. The peculiar thing is that while the property bears a qualitative relation to hardness and to the tensile properties it does not go along smoothly with either, and some means of evaluating it must be standardized. A number of machines have been tried, and their merits were discussed. There was also discussion of the technique of preparing and etching copper samples, in view of the fact that both copper sessions had been illustrated with unusually good photomicrographs.

THE final meeting Thursday afternoon was frankly an experiment. Previous meetings were intended mainly for production men, and, as the users of wire are the real judges of the success of production methods, it was thought that a frank interchange of ideas as viewed from the consumer's side might be productive of an interesting discussion. **Mr. Murray's** paper was well conceived and well delivered.

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THE discussion developed quite naturally around the subjects of specifications, and of cooperation between buyer and seller. Much of the manufacturers' wire sold goes into products in which wire is a small though perhaps vital item. The buyer neither has nor needs to have a profound knowledge of wire. Difficulties sometimes arise out of the fact that specifications may cover a combination of chemical and physical attributes which are contradictory. Such specifications may sometimes be made up from physical tests and chemical analysis of a satisfactory sample, which may be one of those rare lots of wire with which we are all familiar which display remarkable properties and are almost impossible to duplicate in regular practice. The feeling was expressed that many such buyers specify more drastically than necessary and pay too much in consequence.

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ON the whole the most satisfactory specification for the small buyer, the buyer whose wire is a small but vital part of his product, is "to be satisfactory for the purpose intended". This requirement, preferably accompanied by samples of satisfactory wire and the finished article, usually brings the metallurgist to the buyer's mill and satisfaction generally results.

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THE opinion was expressed that the foremen of the plants concerned can often work out these matters more satisfactorily than the metallurgists and purchasing agents. Metallurgists present warmly resented the implication

that they were handling these problems with kid gloves. The discussion was distinctly lively for a few minutes but there was no blood shed.

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ONE problem presented was that of a buyer specifying a grade which the supplier knew he could not use, the supplier sending what he knew was suitable, and the resulting confusion due to efforts to embody the buyer's specifications on the order with private notes to the mill to ignore them. It is a situation that exists, and diplomacy forbids notifying the buyer that he is calling a thing by the wrong name. No real solution was suggested, but the fact was stressed that the salesman must be kept fully informed.

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THIS first "Customer-Relations" session was reminiscent of the early discussion sessions of the Association, marked by the same reluctance on the part of the newcomers to take the floor. If this idea can be built up to the point which the regular sessions have now reached, both parties will profit.

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AT the Annual Meeting of the Wire Association, held at Chicago, Illinois, Monday, September 30th, 1935, the following officers were elected for the ensuing year:

President:

JOHN MORDICA, Supt., Rod and Wire Works, Bethlehem Steel Co., Sparrows Point. Md.

Vice President:

L. D. GRANGER, Asst. to Vice President, Wickwire Spencer Steel Co., New York, N. Y.

Vice President:

E. W. CLARK, Mechanical Engr., Wire & Cable Section, General Electric Co., Schenectady, N. Y.

Secretary:

R. E. BROWN, President, WIRE AND WIRE PRODUCTS, New York, N. Y.

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AS a result of the vote of the members for directors and in accordance with the policy of the Association to have at least two new Directors on the Board each year, the following Directors retired:

J. C. WARD, JR., Assistant to President, United Aircraft Corp., East Hartford, Conn.

E. P. KASTIEN, Peoria, Illinois.

In their places the following were the new members of the Board elected:

J. K. BOLL, Manager, Wire Sales, Wheeling Steel Corp., Wheeling, West Virginia.

R. S. SIMMONS, General Metallurgist, Keystone Steel & Wire Co., Peoria, Illinois.

The following Directors were re-elected for a three year term:

JOHN MORDICA, Supt., Rod and Wire Works, Bethlehem Steel Co., Sparrows Point, Md.

E. W. CLARK, Mechanical Engr., Wire and Cable Section, General Electric Co., Schenectady, N. Y.

C. S. BARNINGHAM, Sales Manager, New England Butt Co., Providence, R. I.

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IMMEDIATELY following the directors meeting a luncheon was given in the Congress Hotel to the officers and directors, the chairmen of the various sessions and the authors of the papers which were to be presented for discussion at the meetings immediately following.

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THIS luncheon was a new idea this year and resulted in a much better handling of the program at the meetings, as each chairman had an opportunity to arrange with the speakers at his meeting for the proper presentation and handling of the session.

RICHARD E. BROWN
Secretary, The Wire Association, Publisher, WIRE AND WIRE PRODUCTS.

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FOLLOWING the luncheon, the annual meeting of the Wire Association was held. At this meeting, the report of the Secretary-Treasurer, outlining the material increase in membership and improved financial condition of the Association was presented and approved, and plans were discussed for increasing the scope of the Association activities and developing its membership during the coming year. Plans were also laid for a "bigger and better meeting" in 1936.

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AT the annual directors meeting, among the principal matters decided which are of general interest to members of the Association were the following:

1—The decision of the directors to continue to hold their meetings jointly with the National Metal Congress under the same conditions as heretofore held.

2—To broaden the effort of the Wire Association along educational lines in colleges and universities and to that end, to invite the members of the senior classes of the universities geographically closest to our point of next meeting to attend some of our sessions in order to have them become "wire conscious". This decision was reached as it was felt that in the very near future men trained along engineering and metallurgical lines would more nearly fill the requirements demanded by the production end of the industry than had heretofore been the case.

3—The Board of Directors extended a unanimous vote of thanks and expression of appreciation to **Richard E. Brown,** Secretary of the Association and publisher of WIRE & WIRE PRODUCTS for his work, both in developing the Association and in handling the ramifications and details of its activities.

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ON motion of **Mr. John C. Callaghan,** Works Manager, Can-

ada Works, Steel Company of Canada, seconded by **Mr. E. W. Clark,** Mechanical Engineer, Wire & Cable Section, General Electric Co., and by **Mr. Ralph K. Clifford,** General Superintendent, Continental Steel Company, it was unanimously voted that WIRE & WIRE PRODUCTS was to continue to have the **exclusive publication** of all papers submitted by members of the Wire Association and others during the year and for presentation at the annual meetings of the Association for discussion.

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IT was decided unanimously and without any reservations of any kind that the services rendered by **Mr. Brown** to the Association entitled him to such exclusive publication of all papers presented each year before the Association's meetings or written during the year for presentation to the Association —the title to the papers to be vested in The Wire Association— all papers to be copyrighted by WIRE & WIRE PRODUCTS in the name of that publication and that WIRE & WIRE PRODUCTS should continue to be the exclusive organ for the dissemination of anything relating to the activities of the Association and **Mr. Brown** was further authorized to take any action necessary at any time to maintain this position.

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IN this connection this arrangement was originally entered into in 1929 and was ratified in 1931. The action taken at this meeting and confirming this arrangement was the result of a request by **Mr. Brown,** publisher of WIRE & WIRE PRODUCTS, for a reaffirmation of the arrangement. He stated to the Board of Directors that since The Wire Association had become recognized as one of America's leading technical associations, the publishers of one or two other papers had been making every effort to secure direct from the authors of the various papers, the right to publish these papers, without regard to any arrangement which might have been made by the Wire Association for their publication. **Mr. Brown** stated that he had one particular case in mind and only one but that he would like to know if it was the wish of the Board of Directors to continue the existing arrangement or to alter it to meet the wishes of other publishers.

A Machine To Detect Variations In Diameter While Wire Is Traveling Through Any Winding or Coiling Operation

AN interesting development is a machine which will automatically detect variations in diameter of covered wire. **Mr. R. L. Davis,** inventor of the machine, when interviewed stated:

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FOR over twenty years I have been more or less connected with the manufacture of rubber covered wire, and I have always been impressed with the large percentage of rejections caused by electric faults in the rubber compound. These rejections run anywhere from 10% to 30% of the total amount of rubber covered wire tested. While the faults are easy to repair and there is no great loss of material, there is a lot of extra handling which costs money.

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FOR a long while I assumed that a great deal of these faults were caused by lack of attention on the operator's part when electric check testing the wire in the process of manufacture. For that reason, I worked up a scheme to locate these faults through telephone head receivers so that the operator would be absolutely sure to know when a fault occurred. I then worked along the lines that if there were enough variation in current to make a noise in the head phone, this variation in current could be amplified so as to operate a relay automatic stop machine when a fault was located. This was the real basis of the entire system.

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LATER, I discovered that another reason for the large percentage of failures in the tank test was that the source of electricity, which was necessarily weak to prevent the operator from being hurt, was not sufficient to break down all the faults. The standard practice was to use ignition coils or magnetos. I experimented with various types of limited current transformers and developed a transformer on which the current was definitely limited to an amount considerably below the point when an accidental shock is dangerous to an operator but, at the same time, ample to burn out any weakness in the dielectric strength of the rubber. By combining this limited current transformer and the electrical relay controls, I was then able to supply a machine that would be powerful enough to locate all the faults and sensitive enough to stop instantaneously when the breakdown occurred.

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THESE machines we have sold to practically all the wire manufacturers in this part of the country and they have been in actual use for the past five years with practically no repairs or replacements. In most cases, the manufacturers have attached the transformer and the automatic controls to their present machines, although we have sold several of the complete machines which we supply with motor, brake, and adjustable traverse. If the present apparatus is in good shape and meets the requirements, there is no need of scrapping, but on the other hand, if the equipment is old and not very good, we are in a position to recommend the purchase of a complete machine.

Registry of Used Wire Machinery

We Offer—Subject to Prior Sale—The Following Used Wire Mill Machinery

No. 237
Electric Resistance Pointers, Capacity .148

Waterbury stand spooler for fine wire.

No. 348
Five-block rod bench with gear drive and motor, 26″ and 22″ blocks.

No. 400
Twenty head enameling machine complete, capacity down to .001.

No. 401
Eight head spooler, capacity 200 lb. spools, motor driven.

No. 402
Hayes electric furnaces, automatic control, with 32 head spooler, for fine wire.

No. 403
Waterbury straight roll fine wire machines, motor and belt drive.

No. 408
Barron and Crowther 3 hole continuous wire machines, ranges from No. 5 rod to 21 gauge.

No. 409
Wire pointers for bench or post mounting, ¼ to No. 12.

No. 418
Five 4-penny nail machines (German design)

No. 432
24 block intermediate frame with 16″ blocks, reducer, and pulley drive.

No. 441
Vertical Riehle tensile testing machines, 600, 2500, and 10,000

No. 445
Five-head S. & H. florist wire machine.

No. 447
Electric butt welders, 8 to 20 gauge steel.

No. 449
Electric butt welders, 4 to 20 gauge steel.

No. 450
Electric butt welders, 8 to 20 gauge copper.

No. 451
Electric butt welders, 5/16 to 1/8 inch copper.

No. 452
Spot welders, 18″ throat.

No. 456
Tinning equipment:
10 and 20 block fine wire units, 8″ block.
8 block unit for 16″ and 22″ blocks.

No. 459
Shuster straightening and cutting machine for ⅝ round.

No. 460
120 National Nail machines, 2D to 60 D.

No. 461
15 Lambert Cut Nail machines 4 D to 10 D.

No. 464
9 Emery Barb Wire Machines, 2 and 4 point.

No. 465
Am. Hard Rubber Acid Pump, Model B-244, 2″ x 4″.

No. 467
300 tons ⅛″ square wire, .80 carbon, 180,000 tensile, on 150 lb. spools.

No. 469
Two and four blocks heavy rod benches with motors and drives.

No. 470
24-carrier single deck textile 4″ braiders.

WE HAVE BUYERS FOR THE FOLLOWING

No. 411
A 5-keg nail tumbler.

No. 416
Small riveting machines, Townsend No. 1 or equivalent.

No. 420
4 block rod bench, 22″ or 24″.

No. 427
2¼″ x 6″ c. r. mills with take-ups.

No. 436
Flattening mill for .10 x .014 stapling.

No. 439
Rivet machine for #7 ga. wire. Speed not important.

No. 442
Automatic keg-head printing machine, 9″ to 12″.

No. 444
Machine to make diamond pointed staples.

No. 446
Straightening and cutting machine for 12 to 16 gauge wire.

No. 448
7-wire planetary closing machine for 24″ reels.

No. 453
1 single head ripping machine for tungsten carbide dies.

No. 454
Vaughn Motobloc for ¾″ steel.

No. 457
Diamond die polishing machines
1 for .080
2 for .050
3 for .025

No. 458
Equipment for manufacturing Tungsten and Molybdenum wire, press and dies, slug treating, swaging, drawing and spooling machines.

No. 468
Machine for straightening and cutting narrow flats.
Slitter for 16 ga. up to 20″ wide.
Roll flattener for strips ⅛″ thick up to 20″ wide.
Machine for round edging narrow flats.

No. 471
Continuous electro galvanizing machine for screen cloth.

Dunscomb Associates

BOX 320, C/O WIRE AND WIRE PRODUCTS — 17 EAST 42nd ST., NEW YORK, N. Y.

REGISTRY OF USED WIRE MILL MACHINERY

Oxygen-Free Copper

By Henry M. Schleicher

Metallurgist, United States Metals Refining Company
Oxygen-Free Copper Department, New York, N. Y.

A discussion of the paper by R. A. Schatzel, Superintendent, General Research Laboratories, General Cable Corporation, Rome, N. Y., entitled "Hard and Soft Copper Wire" as presented before the Wire Association, October 1, 1935 and published in the September issue of WIRE AND WIRE PRODUCTS. ✦ ✦ ✦ ✦

MR. Schatzel is to be congratulated on his excellent paper which contains so much valuable information in concise form. Some of the data can be found in the literature but his collating and abstracting it with enlightening comments help those of us who are daily confronted with technical problems pertaining to the casting and fabricating of copper.

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AS metallurgists engaged in casting copper, those portions of Mr. Schatzel's paper dealing with our field naturally interest us most, particularly the statements with regard to the improvements in wire bars to overcome the "well known embrittling effect caused by excessive oxygen content especially on the set surface", whereby "those remarkable properties of ductility and toughness with which copper is by nature endowed" can be utilized to the fullest extent.

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MR. Schatzel has spoken of various means developed by refineries to avoid or eliminate the difficulties mentioned, one of them being end or vertical casting in an inert atmosphere. As we are familiar with this method, it was thought that a few comments supplementing Mr. Schatzel's remarks might be of interest to the members of this Association.

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HE has shown the micro-structure of oxygen-free and of horizontally cast tough pitch copper wire bars, but as all of the members may not be familiar with the appearance of these two kinds of wire bars, a typical example of each is shown in Figure 1.

Fig. 1. Copper Wire Bars. ✦ ✦ ✦ ✦ ✦ ✦ ✦ ✦

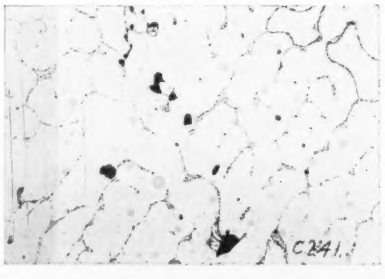
Horizontally Cast Electrolytic Tough Pitch Wire Bar. ✦ ✦ ✦ ✦ ✦

✦ ✦ ✦

THE shrink hole occurring at the top of oxygen-free copper shapes is characteristic of sound gas-free metal. It is, of course, cropped before shipment.

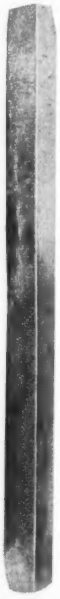
Fig. 2. Microstructure of Cast Copper. ✦ ✦ ✦ ✦ ✦ ✦

High Conductivity Oxygen-Free Copper 100X.



✦ Electrolytic Tough Pitch Copper 100X. ✦

SEVERAL views illustrative of the micro-structure of tough pitch copper have also been presented and in contrast with these, Figure 2 shows the micro-structure of oxygen-free copper. To facilitate comparison there is also another typical micrograph of tough pitch copper.



Vertically cast High Conductivity Oxygen-free Wire Bar.

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THE large crystals with fine regular boundaries are characteristic of the cast structure of oxygen-free copper.

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IN ordinary electrolytic tough pitch copper the oxides of certain impurities are largely present along with the cuprous oxide in the boundaries between grains. Since extraneous matter is not observed on microscopic examination of oxygen-free copper even at much higher magnification, it is evident that such impurities as are present exist in solid solution. Because impurities in such condition adversely affect the electrical conductivity of copper much more markedly than if they were precipitated during solidification, it will be appreciated that only by using the purest

raw materials and by keeping the copper very low in impurities can oxygen-free copper of high conductivity be produced.

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Density

MR. Schatzel has shown a diagram of a section of a horizontally cast wedge cake containing about 0.04% oxygen which illustrates the variation in density normally encountered in horizontally cast shapes. The average density of the whole section was 8.53, increasing quite regularly from a mean of 8.37 along the top to a mean of 8.61 along the bottom.

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ALTHOUGH we have made no such detailed study of the density of oxygen-free copper, whole bars are regularly tested as a feature of production control by means of the apparatus illustrated in Figure 3.

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THE scale is specially built with a metric beam and weights having a capacity of 400 pounds. The beam arm is graduated to fifty divisions for one kilo (about ¾ of an ounce per division) and by using small wires for weights, to which the scale is sensitive, readings to 5 grams or less than 1/5 of an ounce are obtained. The average of a large number of such determinations on whole cast shapes of oxygen-free copper is 8.867, with a range from 8.78 to 8.95.

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Oxide in Copper:

MR. Schatzel has pointed out the embrittling effect of cuprous oxide as manifested in cold working copper. There is a similar, though much more severe, effect when copper containing even minute quantities of oxygen is subjected to the action of reducing gases at elevated temperatures. All the oxide present is removed, leaving open spaces between the grains, with the result that the metal loses virtually all its ductility and strength. In the absence of oxygen such treatment only coarsens the grains; the metal remains intact.

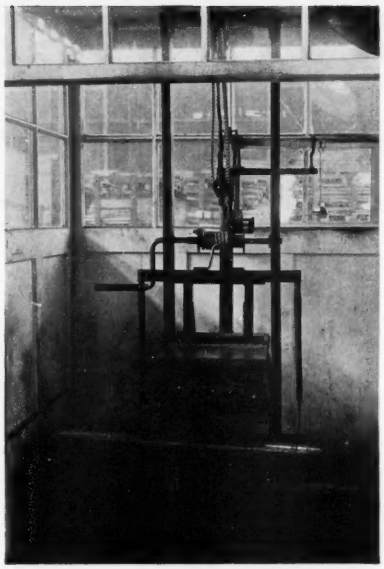

Fig. 3. Apparatus for Determining Density of Full Size Bars. ✦ ✦ ✦ ✦

✦ ✦ ✦

IN Figure 4 are shown views of electrolytic tough pitch copper and oxygen-free copper after annealing in hydrogen at 850 deg. C. (1560 deg. F.) for thirty minutes. The micrographs are of cross-sections of No. 12 B&S gauge (.081 in. diam.) wires at 100X magnification. Note the difference in the size of the grains. The ordinary copper became a spongy mass incapable of withstanding any working, while the oxygen-free copper was unharmed.

IN gas welding and brazing this property of oxygen-free copper is of particular importance. Even though bright-annealing operations are customarily conducted at temperatures well below the critical range, the danger of a slight loss in ductility and strength through the attack of reducing gases may be avoided with oxygen-free copper.

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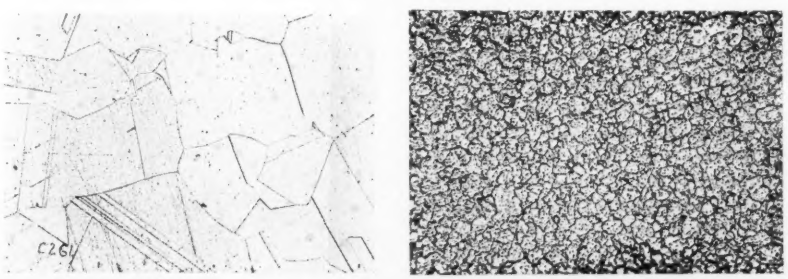
THIS action of hydrogen is employed as a regular feature of control in the production of oxygen-free copper. Samples taken from the cast shapes are forged and drawn to No. 12 B&S gauge (.081 in. diam.) wires. After heating in hydrogen at 850 deg. C. (1560 deg. F.) for one-half hour the wires are bent over anvils with a radius of 0.2 inch. To be classed as oxygen-free copper the samples must withstand at least 10 ninety degree reverse bends. Similarly prepared specimens of electrolytic tough pitch copper break in less than one complete bend under such conditions. Indeed the test is extremely sensitive, for copper containing some oxygen, though in amounts too slight for detection by microscopic examination, cannot meet the established standard of ten bends. For this reason we recommend the use of the "hydrogen bend test" as the most satisfactory means of determining whether copper is actually free from cuprous oxide.

✦ ✦ ✦

Fig. 4. Microstructure of No. 12 B&S Gauge Wires After Annealing in Hydrogen at 850°C. (1560°F.) for 30 minutes. ✦ ✦ ✦ ✦ ✦ ✦ ✦ ✦ ✦ ✦



Cross Section High Conductivity Oxygen Free Copper 100X. ✦ ✦ ✦ ✦ Cross Section Electrolytic Tough Pitch Copper 100X. ✦ ✦ ✦ ✦ ✦

Material Handling of Rods and Wire

By Frederick A. Westphal

Superintendent of Wire Mills, Sheffield Steel Corporation, Kansas City, Mo.

A study of material handling layout for wire mills presented in the form of a lecture before the Wire Association at Chicago, Illinois, on October 1, 1935 and being the second part of a paper entitled "Acid Cleaning and Material Handling of Rods and Wire". Part I relating to Acid Cleaning Methods was published in the September, 1935 issue of WIRE AND WIRE PRODUCTS. ✦

IN the planning of the material handling lay-out of a plant it is essential that the engineers concerned fully understand and appreciate the exact details of conversion of the certain phase of manufacture of the industry. Then the line of thought progresses through the processes to the ultimate goal or the desired finished product, fully bearing in mind capitalization costs, conversion costs, quality factor, time element and other pertinent factors. Some may calculate the work to be performed in the project into statistical data, such as tons per man per eight hour turn or the reciprocal, namely, man-hours per ton, thereby keeping in accord with the systems of their respective companies.

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IN the building of the material handling system, the engineers consider (1) that they are starting with merely the land and start from scratch; or (2) that they are expanding an already operating plant and must dove-tail or coordinate into the existing set-up and conclude their projects into wholly cooperative units; or (3) that they are devising or originating a material handling system in an established set-up and that the same conversions and processes necessarily must stay **put** in the same location or buildings. By working under conditions stated in (1) or (2) it is ideal for the engineer, but conditions under (3) may present obstacles that call for extra ingenuity and resourcefulness in solving a definite change in system of material handling, of course, bearing in mind the ever-thoughtful-item—the costs for installation and savings returned after the installation is fully operating successfully.

HEREWITH are brief comments and explanations pertaining to each of the departments concerned in this subject:

Rod Storage Department

THERE are two electric-driven tramrail hairpin hook carriers that function by (1) disposing of production from a Morgan Combination Rod Mill, (2) delivering to storage or to the acid cleaning house, (3) placing in cars prior to shipping.

✦ ✦ ✦

THE mean elevation from overhead track to floor is 36'3"

FREDERICK A. WESTPHAL

Born Holyoke, Mass., 1895. Educated U. S. Naval Academy. Four years with American Steel & Wire Co. In 1922 Assistant Superintendent, Rod and Wire Works, Jones & Laughlin Steel Corp., Aliquippa, Pa. In 1928 Superintendent of Wire Mills, Sheffield Steel Corp., Kansas City, Mo. During World War served as Officer Sixth Field Artillery—severely wounded in action—twice cited and decorated for gallantry in action and meritorious services. Director of the Wire Association.

and the weight of the unit load is approximately 3600 lbs. net. There are 36 separate tracks for conveying production or stocking, with room for expansion, and the length of each track is 145' overall in storage spaces; 42 sliding switches — two-way and some three-way are used for changing direction; there is enough height to pile at least eight coils high; separators are in place, in concrete or welded, to definitely separate sizes and grades, such as coiled nut flats of various sizes, rivet rods, bolt wire rods, and the various sizes and heats for market wire, etc.

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FROM the time a lift of rods is taken from the starwheel of the Morgan Rod Mill, only the craneman in the cab of the electric carrier handles the load to either shipping, storage or cleaning house. It is understood that inspectors may be found most any place vigilantly watching quality, and occasionally the labor gang needs to police the place for tidiness and cleanliness.

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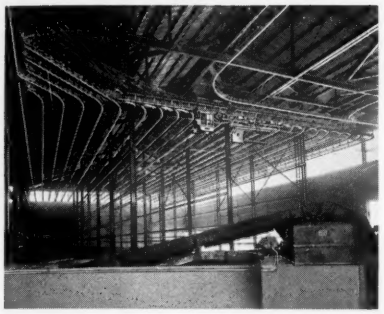
Acid Cleaning Department

AFTER leaving the Rod Storage Department, the electric hook carrier goes at the aforestated elevation for a distance of approximately 375' over a bridge crossing a thoroughfare then along side the cleaning house building and then in position at the cleaning tubs. The unit load of 3600 lbs. net is lowered and placed on either of three transfer buggies or trucks that are moved on fixed tracks on the floor and forward of the runway of the gantry crane. Next the load is pushed through a suspended **cleaning hook** of acid resisting metal that is held by the



No. 1. Thirty-six separate lines of overhead rail and forty-two switches serve the storage spaces.

gantry crane preparatory to being placed in position in a straight-line cleaning house unit for acid cleaning and subsequent treatment. The total travel of the gantry crane is 150′ overall.

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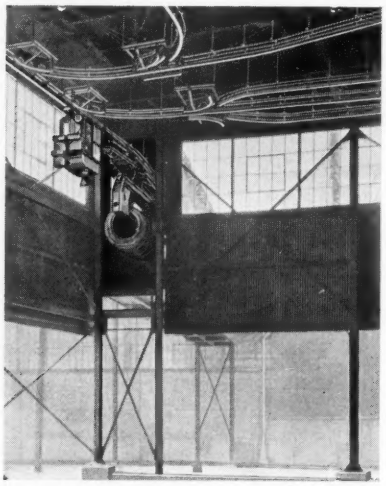


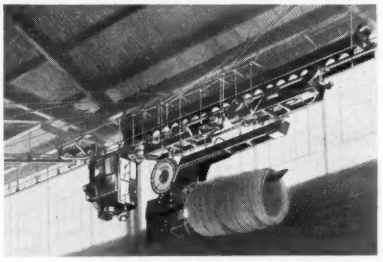
No. 2. The entrance to the covered bridge connecting the rod storage and cleaning house buildings. ✦ ✦ ✦ ✦ ✦

Baking Department

AT the opposite end of the cleaning unit of 104′ is another individual transfer buggy or truck that also moves on a fixed track on the floor. When the rods or wire are fully prepared for baking, the gantry crane hoists the unit load by the same **cleaning house hook** and places it on aforementioned individual transfer buggy; then the buggy is moved forward clear of the **cleaning house hook** and subsequently the conveyor hook is run into the interior of the load preparatory to being again hoisted, this time by an air hoist; and now the **conveyor hook** with its load is conveyed by an overhead track to the bakers.

✦ ✦ ✦

THERE are a total of 15 sliding two-way switches and three-way switches for changing direction for the charging of the six tracks of the baking unit. By applying the correct movement of switches the unit loads are switched, of course, still on **conveyor hooks,** and automatically enter on



No. 3. An indicating dial scale is built into the overhead system. Loads are weighed enroute with a minimum delay. ✦ ✦ ✦ ✦

the track of the alley of the baker desired. There is a slight grade downward of each six tracks through the baker, and on the exit end of each track there is a brake that holds the loads in the baker. Incidentally, the doors on the entering ends of each alley are fastened to counterweights that automatically allow opening and closing.

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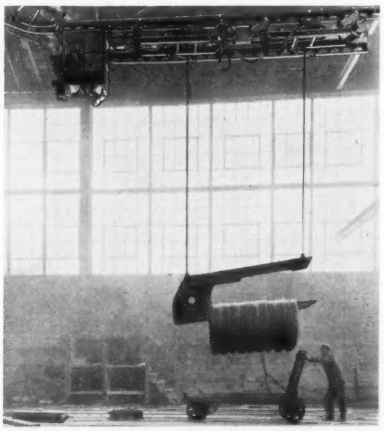
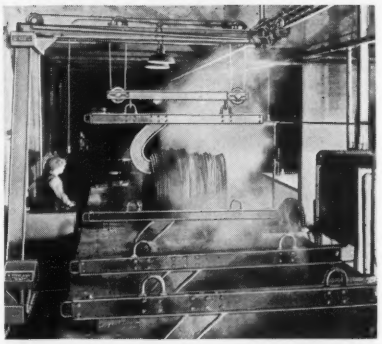
Wire Drawing Department

IT is appreciated and obvious that a carefully planned schedule



No. 4. At the entrance to the cleaning house, the 3600 lb. loads are lowered to a transfer buggy on fixed floor tracks and drawn to the cleaning tubs. ✦ ✦ ✦ ✦ ✦



No. 5. Via a single leg gantry crane the load is carried through the cleaning processes on a cleaning hook of acid-resisting metal. ✦ ✦

and identification of rods and wire can be ascertained throughout all processes at all times.

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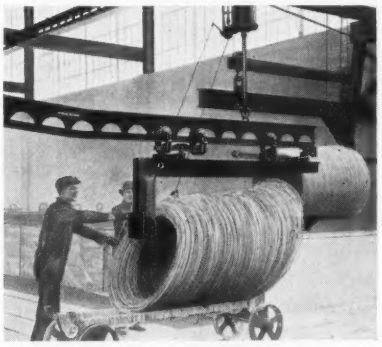
AFTER completion of baking, the exit doors are opened by hand and the operator releases the brake on the track of rods or wire desired and allows the **conveyor**



No. 6. At the finish end of the cleaning unit, loads are again transferred to the overhead system enroute to the bakers. ✦ ✦ ✦

hook to roll out through the switch of its respective track and then moved forward to the overhead delivery track.

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THERE are 34 sliding switches, mostly all two-way switches, in this department and here the operator delivers to each respective wire drawer or particular machine or to the stocking area. At the time the wire drawer gets his **conveyor hook** of rods or wire here he is in position to weld the ends together of each successive coil of rods or wire or **point** the ends preparatory to drafting. Lastly, the wire drawer has strippers and hoists for further handling and

(*Please turn to page 544*)

Industrial Relations As Applied To The Wire Industry

By E. W. Kempton

Director of Industrial Relations
American Steel & Wire Company, Cleveland, Ohio

A study of industrial relations in the wire industry based on a questionaire sent to the industry and presented as an address before the Wire Association at Chicago, Ill., on October 2, 1935. ✦ ✦ ✦

IT has been my purpose to prepare, for you, a quantitative study of the wire industry upon the subject of industrial relations. The qualitative features will be confined to such analysis and discussion upon this study as I am able to make and must be regarded as my own personal opinion. A questionnaire was prepared, based largely, but not entirely, upon a similar questionnaire of the National Industrial Conference Board. Through this questionnaire it was my expectation that we should be able to secure sufficient information pertaining to industrial relations policies in the wire industry to indicate to us just how far the wire industry has gone in what might be termed progressive employe-employer relationships. I wish right here to express my appreciation to Mr. R. E. Brown, Secretary of the Wire Association, for the assistance which he rendered to me in securing the information which I have at my command. One might have expected a larger number of replies, but experience with the questionnaire method of securing information is not always as successful as this effort. Replies were representative of the industry in its many phases, and I also wish to express my appreciation to those who contributed their time to this study. A total of forty-one replies was received to this questionnaire and I see no reason why we may not accept these replies as being fairly representative of what is taking place in the wire industry.

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Employment Policies

THE activities ordinarily considered first under the subject are those of the regular Employment Department. Of the companies making answer seventy-three percent have, as a policy, centralized employment. This simple fact; of itself, is significant because it is not so long ago, as time is measured, since each foreman was his own employing officer. He went to the gate in the morning and looked the line over, did not hesitate to place his hand upon candidates to feel of biceps or thighs, and the employing process often involved only the crooking of the finger. In fact the process frequently involved a renaming of the successful candidate, for if the name appeared to be too complicated the foreman did not hesitate to assign a simplified name which was effective from that time on. Although the foreman is by no means entirely excused, under present day methods, from the hiring responsibility, through centralized employment more consistent procedure is possible, and better results.

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Job Specifications

TWENTY-FOUR percent of the reporting companies use job specifications to assist in the employing process. It may be argued that an employing officer should know the jobs of the plant sufficiently well so that job specifications would be unnecessary. The real benefit of job specifications is not so much in the Employment Department as in the fact that the foreman is required to carefully analyze the jobs to determine what type of a man is necessary on the particular job. A distinct advantage always follows careful analysis, the advantage here being to the foreman in a more thorough study of jobs under his supervision. Facts are revealed to him that he had failed to appreciate. It is a pity that we do not study the personnel requirements of the job as carefully as we study machines.

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Discharge Policies

THIRTY-FOUR percent of the companies centralize their discharge. By this is meant that the prerogative of indiscriminate discharge is removed from the foreman and before discharge becomes effective the case must be reviewed by some other authority, such as the employment officer, or the superintendent, and sometimes both. It would be fairly safe to predict that more care will be exercised in the future to eliminate thoughtless discharge. This same principle should apply to disciplinary cases, where, because of some infraction, employes are penalized. It is desirable, in such cases, from a standpoint of maintaining harmony in the family, to have penalties awarded in cool afterthought and with consistency. This can be accomplished only when such cases are referred to a third party.

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Layoff Procedure

A DEFINITE layoff procedure is adopted by twenty-seven percent of the reporting companies. Here again, because of the trend of the times, it would appear that more definite procedures will be adopted by industry to avoid claims of discrimination and to assure

fairness of dealings with all employes. The adoption of unemployment insurance will have a profound effect.

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Dismissal Compensation

OF the reporting companies, but one indicated that it had, in effect, a policy of dismissal compensation. Unemployment insurance, after it is fully developed, will be little else than dismissal compensation, therefore this policy will be definitized throughout industry.

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Employment Guarantee

NO company in the wire industry reported that it made any form of an employment guarantee. It is doubtful that such a guarantee could be made in an industry like the wire industry. There is some loose talk about every workman being guaranteed an annual income, but however desirable this might appear from a social point of view, it is difficult to believe that it is practical.

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Systematic Work Sharing

SYSTEMATIC work sharing ties in very closely with a definite layoff procedure, and it is pleasing to note that thirty-nine percent of the companies do have some systematic method of distributing work among employes. Here, too, the application of unemployment insurance will have an effect. Perhaps no one action of a foreman is so closely watched by his employes as his division of work, and certainly no one activity will lead to so much dissatisfaction if there is favoritism shown. This involves training policies and classification or rating of employes.

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PERHAPS here is the best place to call attention to the desirability of having a limited number of employes who can perform adequately in different operations. There will be an advantage, in the future, in having a force of workers just as versatile as possible. The ideal situation would be one where all workers might be capable of transfer from department to department as the demands of the business require. This is, of course, impractical, but there should be a limited number of men capable of quick transfer. More detailed discussion of this subject than we have time for at present, could demonstrate the advantages of such a policy.

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Supervised Training of Employes

FORTY-THREE percent of companies have a supervised training procedure of some form or other. Seventeen percent are training apprentices for the most part for the mechanical and maintenance departments. The past five years have taken a normal toll in deaths, retirements, etc., and in addition many journeymen mechanics, because of slack operations or possibly no work at all during recent years, have gone into business for themselves in some small way. These men may not return to industry. Then there has been little, if any, training of apprentices during these years. All of this would signify that there may be an increased need for apprenticeship training in the mechanical trades. There are advantages that make it worthwhile for an employer to train his own mechanics and the cost is insignificant, if there is any cost at all.

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AS for the training of new employes for manufacturing operations, twenty-four percent of companies report some activity. Fifteen percent report that they have specific training to prepare men for supervisional jobs. Forty-four percent report that they have foremen's conferences, and this subject I will discuss in detail later. Only four companies report any special activity with graduates of technical colleges. This is rather surprising because the wire industry is becoming increasingly technical and there appears to be, in the industry, a well defined place for the graduate of the technical institution, and reference is made to other than strictly technical positions such as chemists and physical laboratorians.

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Medical Aid to Employees

TURNING now to an entirely different phase of industrial relations, we find that eighty-one percent of the industry furnishes some form of medical aid to employes. Fifty-one percent have plant hospitals and forty-four percent have plant nurses. That nurses are not used in place of surgeons is shown by the fact that sixty-six percent have plant surgeons and twenty-four percent have both plant nurses and plant surgeons. Plant surgeons are on a salary basis in fifty-six percent of cases where such service is maintained, and on a fee basis in forty-eight percent of cases. A few companies have surgeons on both a salary and a fee basis. Arguments may be put forth on either side of the controversy as to whether or not a plant surgeon should be on a a salary basis or on a fee basis. Four companies now employ visiting nurses and one company reports a dental clinic. Seventy-three percent of companies report that they have organized first aid. Physical examinations are given to new employes by seventy-one percent of the industry and periodic physical examinations are given in twenty-seven percent. There is a distinct advantage, not alone to the employer but the employe, in giving, to older employees, a periodic physical examination. Some men, as they grow older, develop physical disabilities which unfit them for certain types of employment. A physical examination every few years, or even every year, after the age of 50, may indicate a subsequent transfer of employment, that, of itself, may prolong life.

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Safety Policies

THERE is no question about the wire industry being safety conscious for eighty percent have an organized safety program. If there is any industry which has made a creditable showing in regard to decreasing the accident hazard, it is wire manufacturing, which has been converted from a hazardous industry to one that is relatively safe. Safety inspectors are employed by sixty-three percent of the reporting companies, and seventy-six percent have safety committees.

Other Factors in Industrial Relations

IT is clear, from the number of items in this survey, that there are more than a few factors entering into the field of industrial relations. There are even more factors than have been covered for nothing has been said about wages, earnings, rates of pay, or methods of computing wages. The whole field of Industrial Engineering ties so closely to Industrial Relations that in some companies we find the department of Industrial Engineering correlated with the Industrial Relations Department. However, Industrial Relations, that is good relationships within the industrial family are not wholly dependent upon wages or wage policies.

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Policies Affecting Labor Turnover

NOT all the labor difficulties of the past two years have been confined to low wage industries. Employes take into consideration other policies of management even though these policies may, to some extent, adversely affect wage levels. Any service which is rendered to the employe by the employer must be considered a wage cost. A company may have a pension plan which costs up to five or six percent of the payroll and this must be considered as a wage cost. It is important to bring such facts to the attention of employes, for, in general, it will be found that employes are reluctant to give up such advantages in lieu of an equivalent increase in their wages. This is called to your attention because there are certain services rendered by the employer which are looked upon by employes as more important than their equivalent cost in wages. Assuredly this is true of an organized safety program.

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Desirability of Acquainting Employes With Matters of General Policy

IN the past, management as a whole has made a serious mistake in not carrying out a more definite program of selling the company and its policies to employes. As has been indicated by this survey, the wire industry stands for advanced employe-employer relationships and employes should be made aware of this fact. Then again, as a policy is extended over a period of years it becomes accepted as a matter of fact, employes losing sight of both the significance of the policy and also the cost in dollars and cents and its relationship to the payroll. Not only is this true of the rank and file of employes but it is equally true of foremen. Foremen who have grown old in the service have seen a slow evolution of policies, which they fail to use as a selling point because they are too close to the job; things have become matter of fact. They could, if they would, because of their total experience, visualize and use to good advantage the changes that have taken place, the improvements that have been made and the fact that more serious consideration is given to working conditions and general policies of industrial relations that have to do with the comfort, well being, and contented state of mind of the employe. Younger foremen, however, who have not been present in industry during this evolution, simply accept conditions as they are and altogether too frequently are not conversant with company policy. Often they are not in a position to intelligently discuss, with employes, the broadminded attitude of management to industrial relations policies.

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Relation Between Foreman And Workers

THE spot most often attacked, and rightly so, in management's relations with employes, is the relation between foremen and workers. This is no criticism of foremen, but rather of management, for too frequently foremen are kept in ignorance of essential information, and are not sufficiently taken into the confidence of management. If there are forgotten men in industry they comprise the foremen and petty supervisors, who are not in a position to answer questions and debate problems with inquiring workers. They cannot fulfill their obligations as builders of morale. It is to correct just such a situation that many companies have embarked upon a program of Foremen's Conferences. The Foremen's Conference is an educational effort upon the part of the management to place in the hands of foremen information that will be helpful to them in their everyday contacts with employes. Such conferences may be under the leadership of a man trained for this purpose, or they may be informal meetings arranged by and with the superintendent. It doesn't matter so long as the foreman is given an opportunity to discuss his problems and to secure information which will be helpful to him in promoting a state of complete understanding among his workers, and between management and men.

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THERE is little value in embarking upon even such an ordinary policy as a group insurance program unless the foremen and other minor executives are given the necessary information to enable them to intelligently discuss just what group insurance is, just what the rights and privileges of the employe are and what advantage the employe secures through participation.

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Advantages of Foremen's Meetings

THERE are other policies of management that are even less tangible, about which the foreman should have requisite knowledge. When foremen gather around a conference table once a week for the purpose of discussing such subjects, under the leadership of one who is capable of developing the right kind of thinking upon the part of foremen, there will be a wholesome reaction upon the morale of all employes due to the higher degree of understanding brought about by these conferences. If there is one thing more important than any other in the field of industrial relations it is

that there be complete understanding upon the part of both management and employes; understanding of management policies upon the part of employes, and understanding of human relationships and of employe psychology upon the part of management. This wholesome relationship cannot be brought about entirely through foremen's conferences but they are an aid, which, in this day of unrest, cannot be overlooked. Sell the company to the foremen before you can hope to sell it to the rank and file of employes.

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Credit Unions

THE number of companies in the wire industry that have Credit Unions organized among their employes is noteworthy. The percentage, fifteen percent, is not high, but a good beginning has been made. To some sections of the country the Credit Union is a new institution. To the east, New England particularly, it is not new. Upon first examination it might appear that the management of a Credit Union is a big responsibility to entrust to employes. With the majority of employes members of a Credit Union, all depositing regularly from their earnings, it does not take long to acquire quite a sizable sum of money for which the management of the Credit Union is responsible. The possibility of exploiting the loan privileges might appear to be something to worry about but the experience of Credit Unions will allay any apprehension in regard to the integrity of the funds collected. There is little opportunity for things to go amiss. Employes may be careless sometimes about the choosing of their Representatives for collective bargaining, but they are meticulous when it comes to choosing their Board of Directors for a Credit Union. It is one thing to talk about handling the company's money but it is quite a different matter when it comes to their own savings.

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THE lessons that are learned by employes about thrift, credit, and particularly in regard to human nature, through a Credit Union, are invaluable. Recently an executive in a large corporation expressed his opinion that of all of the personnel activities in operation in his company he would most dislike to see the Credit Union abandoned. This subject, in all of its details and ramifications, is worthy of complete discussion, but time does not permit going into detail.

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Mutual Benefit Associations

PERHAPS after the Credit Union in importance in personnel activities, in the nature of a service to employes, is the Mutual Benefit Association. The survey conducted revealed that fifty-four percent have such associations in operation. It was surprising to note that a large percentage of such associations include accident benefits and death benefits. The purpose of a Mutual Benefit Association is to provide relief if the normal earning capacity of the individual is suspended due to illness. As a rule the average workman does not have a sufficient fund accumulated in savings to take care of illness, so that often it becomes a catastrophy. Group insurance programs are for the purpose of taking care of death, and workmen's accident compensation for the purpose of compensating the employe following an occupational accident. It would appear, in a well rounded program, that it would not be necessary to include death and accident benefits in the Mutual Benefit Association. The purpose of such an association should be to pay, upon the occasion of illness, without too long a waiting period, as large a benefit as possible for as long a period of time as possible. The good work done by these associations justifies the importance that the industry places upon them.

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Employee Rating Plans

AS has been revealed by this survey, but seven companies have, in operation, rating plans. A rating plan is for the purpose of evaluating an employe. It cannot be as mechanical a process as evaluating a machine but it is just as important. It is interesting to note that only one company applies a rating to executives. Four companies rate foremen and five rate the wage earner. As experience is acquired with unemployment insurance, it would be safe to predict that the rating of employes, especially where there is any considerable number of them, is going to become a matter of importance. With unemployment as a permanent problem and with unemployment insurance facing the employer it will become more important to make an estimate, crude though it may be, of the value of every employe of the organization. An employer simply will not be able to face the additional burden of unemployment insurance unless his employes are worth paying unemployment insurance.

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THERE is another argument in favor of rating employes. With collective bargaining being adopted more universally throughout industry in some form or other, there is a demand upon management to justify layoffs, discharges, and promotions. Whenever a promotion is made, one man is pleased, but there may be a dozen who question the move. With Employe Representation becoming more the order of the day, and with Employe Representatives taking a more active interest in all policies affecting employes, systematic and periodic evaluation of employes becomes important. With the possibility of permanent Labor Boards questioning the fairness of the decision of management in relation to layoffs and discharges, there are additional demands for having a predetermined policy. Throughout industry there is also an increased application of the principle of seniority to reckon with. So although no rating plan has been developed that may be considered without faults, nevertheless it is essential, from a standpoint of harmonious relationships to use some rating plan as a guide in measuring the characteristics and value of employes.

Employes' Magazines

AN employes' magazine is published by ten of the reporting companies. It is perhaps significant that all of the companies that publish a magazine, save one, have employe representation in one form or other. An employes' magazine is an educational instrument and unless it is performing that function it is of little value. It should not be an instrument of propaganda. A company with good employe relationships needs no propaganda. An employes' magazine should be part of the campaign to sell the company and its policies to employes. It should give information about the company and its business that is not readily available to the rank and file of employes. It should carry items of information that will tend to increase the pride of the individual in the company with which he is associated. Employes ought to be able to feel a sense of proprietorship in their magazine and should be encouraged to contribute to it freely. A certain amount of space must be devoted to the usual shop quibs, but such material might well be a minor factor. Many companies having employe representation are using the magazine in cooperation with their employe representatives to encourage confidence in this type of employe-employer relationship.

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ONE company in the Pittsburgh area, not in the wire industry, utilizes one page per week in the local newspaper. On this page is published material usually found in an employes' magazine. Such a plan might be considered by any company located in a relatively small community where a large percentage of the readers of the paper were interested in the company and its employes. An employes' magazine will perform a good piece of work in morale building if properly managed and edited.

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Group Insurance

THE large number of companies that contribute to a group insurance plan for all employes is a good indication of the trend of personnel policies in the wire industry. Sixty-five percent of companies contribute to such a plan. It might be argued that the matter of life insurance is a strictly personal affair which was of no concern to the employer. This is not true because the employer is involved in the social aspects of the community. Before the adoption of group insurance many employers often recognized this responsibility to the extent of making donations to the family of a deceased employe. Unfortunately some employes fail to appreciate the necessity of providing for those who are dependent upon them in the event of death. Any activity upon the part of the employer to alleviate such a situation performs a real social service. My own personal opinion is that group insurance programs should be compulsory in nature, requiring every employe to be a contributor. The most thoughtless and the most improvident often leave the most heart rending conditions behind them. However, compulsion in almost any form is usually resented regardless of the merits of the case, hence it is necessary to fall back upon persuasion and education.

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Universal Pension System

THE adoption of the Social Security Act by Congress, and it approval by the President, creates a universal pension system. Just what effect this may have upon existing pension systems remains to be seen. There are now, in the wire industry, twelve companies that have some form of a pension system. Only one of these requires employe contribution. A more detailed study of these pension systems might reveal that some of them apply only to certain classes of employes. Referring to a State pension system, it would be my opinion that some advantage should accrue to employes who remain for long periods of time with one employer, and there should be some feature to pension credits that would bring, to the employer, certain of the attractions of a private pension plan.

Profit Sharing

ONLY two companies reported any form of a profit sharing plan. It is rather encouraging to note that there are two companies that have profits to share with someone.

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Employee Stock Purchase Plans

THREE companies report a stock purchase plan. Such plans, at one time, were considered an important feature of any thrift program for employes. Criticism has eliminated most of them. The savings of employes ought to be invested only where the equity of the employe is just as secure and safe as possible. This is not true when such savings are invested in stocks that have a fluctuating value. Employes react favorably to such plans just so long as their investment is resulting in enhanced values, but just as soon as market prices drop there is an adverse reaction.

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Vacations

VACATIONS with pay for clerical workers seem to be almost a universal policy throughout the wire industry. Only two companies report that they do not give vacations to clerical workers. Seven companies report that vacations with pay are given to wage earners. Vacation with pay is a deferred wage and must, of course, be considered as a wage cost. Employes are becoming what might be termed vacation conscious and appear to expect that the employer will furnish the vacation. Whether or not such a policy becomes universal throughout industry will depend entirely upon whether it can be absorbed as a wage cost. Not more than a rather definite percentage of a selling price can be devoted to wages, whether in money wages or services. To what extent employes will be willingto take a larger part of their wages in the form of services is as yet undetermined. It is going to be interesting to watch the development of reactions to payroll deductions for pensions and possibly for unemployment insurance.

Suggestion Systems

FORMAL suggestion systems are in operation in thirty-two percent of the companies reporting. The success of a suggestion system depends upon the sincerity of management and the way such a system is directed. The full development of a spirit of cooperation and understanding and an appreciation upon the part of all employes of the part they play in the company, and an appreciation of the relationship of company success to employe success, will lead to participation in making suggestions more than having some very elaborate formal system. Having fancy suggestion boxes, and pretty posters is all very well, but the thing that counts is the sincerity of management and the sharing of the reward with the one making the suggestion.

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Human Relationship Problems

COMING now to the method of handling complaints, grievances, requests, and suggestions of employes, we have what is undoubtedly the most interesting development of industrial relations since the New Deal. Regardless of what company policies may be, wherever a group of men are assembled in an industrial plant there are sure to be problems of human relationships. It is impossible not to have complaints and grievances, some justified and some imaginary. There will always be someone who feels discriminated against and there are always those who give vent to petty jealousies. There will be those who deliberately attempt to stir up trouble. There will be some who have honest grievances.

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OUR questionnaire shows there is no company in the wire industry that depends upon a trade union agreement. Fifty-four percent of companies report that they handle their employer-employe dealings through individual bargaining, although twenty percent report that they have, in effect, both individual bargaining and employe representation. Fifty-one percent report that they have in effect employe representation, the Joint Committee being used in thirty-seven percent, the Employe Committee in thirty-two percent, and the Employe Association in twenty-four percent. Some companies have two and some three of these forms of employe representation in effect.

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THE exact mechanics of employer-employe dealings are more or less unimportant. It is important, however, to make a reasonable attempt to satisfy the demands of that seemingly insatiable factor, human nature, and there is only one way to do it and that is to handle each question promptly, on a basis of frankness and fairness, and to make a real effort to create understanding. If there is one precept of importance it is that understanding leads to satisfaction.

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The Customer is The Real "Boss"

TOO often management and foremen are self satisfied and do not apply sufficient self analysis. It pays to get over on the other side of the fence once in a while and take a look into our own back yard. It always looks different when we see it from the neighbor's yard. A most important fundamental in industrial relations is the premise that there is no spirit of conflict between employes and management, but this must be true. As a general rule the managers of a concern are just as much employes as the wire drawer. All employes are working together in the interest of the success of the concern. The real boss of both management and men is, after all, the customer. He bosses everyone for he must be satisfied. He creates the jobs of both management and employes and he pays their wages and maintains their employment. Unless he is satisfied, jobs cannot exist very long and it is just as much the interest of every last employe as it is of management that the customer be satisfied. This thought can be sold to employes for it has been done. The average employe is not dumb. Far from it. He can be brought to see which side of the bread his butter is on when facts are properly presented to him. He wants to be associated with a successful concern and will lend his best efforts and cooperation if properly solicited and he understands the situation.

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Rights of Stockholders in Relation To Employes

THERE is another party involved who frequently appears as "the forgotten man", namely, the stockholder. After all, he still does have some rights, among which should be considered his right to expect a reasonable return upon hi sinvestment. This idea, too, can be sold to employes; there are relatively few who are so thoroughly wedded to the theory of communism that they have fotgotten self. Speaking of communists, most of those classified as such are merely misguided, uninformed, or misinformed. Management has a responsibility to straighten out some of the loose thinking that is being indulged in so far as industry is concerned and to combat the pernicious propaganda that is being used by those who have the welfare of nobody but themselves at heart. To accomplish this purpose requires giving necessary information to foremen and key men, for, as a general rule, the foreman is not sufficiently conversant with the subject to be able to discuss it. In fact, even higher management is often at a loss to meet radical arguments with such satisfaction as is necessary to straighten things out. For the most part, the radical has a distorted view of things due to his own particular economic situation. Most of our radicals would immediately desert their cause if their economic situation were adjusted to their satisfaction. One of the most radical gentlemen whom it has been my pleasure to encounter, was, before the depression, a most ardent capitalist in a small way. Return to him his status of 1929 and he would be a radical no longer. When faced with a situation like this the foreman nor any other executive will not cope with the situation by mak-

(*Please turn to page 541*)

How to Order Wire

By J. Kenneth Murray

Wire Sales Division, Republic Steel Corp., Chicago, Ill.

An address delivered before the Wire Association at Chicago on October 3, 1935, outlining some principles for ordering wire which, if followed by customers, would facilitate the production and delivery of the specific type of wire desired. ✦

IT is the purpose of this paper to bring out several details of ordering and service on wire products which we hope will lead to an open discussion and perhaps a better mutual understanding of the problems associated therewith.

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BEFORE going into these details let us briefly review the progress of wire during the last few years. Not only to check the improvements in steel wire production to date, but also to show that purchasing, sales and service methods must be alert to keep abreast of the ever changing practices in production and consumption, in order to take advantage of everything available.

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PROGRESS is noted in the following:

(1) GROWTH of alloy wire consumption due to increased production facilities, better laboratory control, wider understanding and circulation of research reports which enable prospective consumers to decide on proper grades to use, together with specifically indicated needs for these alloys.

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(2) THE use of carbide dies and tools has revolutionized both production and condition of finished product. **Do not minimize this.** We now have closer tolerance, more and better finishes, uniform roundness and constant diameter. These features in wire were almost impossible to obtain a few years ago. The doors to greater progress have swung open since the advent of these accurate accessories, and we are promised even greater service from them during the years to come.

(3) MANY mills have made great strides in the production of common and special wire nails. Important improvements in quality of nail stock—head, shank, point, etc., are evident upon examination. Producers are watching closely the trend of requirements in nails and several entirely new items have recently been announced or are just in the offing. Nail cleaning is also being given much attention—which is resulting in a better finished product.

✦ ✦ ✦

J. KENNETH MURRAY

Born in Pittsburgh, Pa., 1901. Five years in the Purchasing and Stores Department, B&O Railroad Company. Three years assistant sales manager Premium Metal & Packing Co., Pittsburgh, Pa. Three and one-half years sales and mill application Tungsten Carbide Dies. Went with Republic Steel Company June 1st, 1933 and now engaged in sales and development work in connection with wire, wire products and tack departments.

(4) PROGRESS in cold heading wire production has manifested itself in the bolt and rivet industry. This with reference to the quality, finish, close-fit, etc., for heading and thread cutting or rolling operations.

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(5) MANY important innovations have appeared in Spring Wire production. As some of these are very recent it is possible that the entire consuming trade has not yet had opportunity to check on the details. It is sufficient here to say they deal with finish—uniformity of quality, etc., and in the end—economy.

✦ ✦ ✦

(6) IMPROVED advertising in greater volume covering more wire products is noted daily. True copy tells the prospective purchaser or user just what he may secure for his various needs. Such advertising is helping to remove the halo from the wire producing and consuming industries, placing them on a practical and semi-scientific basis, where there will be less reference to memory and shrouded mystery. The slogan for coming years should be "Get it on paper and keep it there".

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(7) INCREASE in the number of applications for low carbon wire due to present methods of producing clean, round wire which can be formed, plated or spot welded far better than was possible previously.

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SO much for the review of wire progress. Now let us take up an important detail, the solving of which will be of mutual benefit to users and producers of wire.

"How to Order Wire"

(1) THE quantity should be clearly indicated as to tons—pounds or number of coils of indicated weight.

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(2) SPECIAL note regarding tolerance on size whenever necessary.

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(3) KIND of wire:—Always specify kind or class number where possible, together with finish required.

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(4 IF in coils, specify any necessary details as to inside or outside diameters, weight of coils wanted, etc.

✦ ✦ ✦

(5) IF straightened and cut wire is wanted, always take advantage of total length to match multiples in fabricating length requirements.

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(6) WHILE not absolutely necessary, it will materially assist the operating departments to run **any** wire, if the maker be well informed regarding the nature of the job to be done. If not possible to advise this, at least mention the kind of operation such as bend, spot weld, upset, swage, flatten, thread, drill, punch, etc.

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MOST mills maintain trained metallurgists to check the properties of wire for these details before shipment, and when you do not specify, you are not taking full advantage of the services offered by wire producers.

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ORDERS without full information have rightfully been called "Hope" orders. The buyer hopes the mill knows what is wanted—and the producer hopes they can use what he sends—based on his best interpretation of details specified. We like to feel that we are giving you what you want. But it is very hard to guess.

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JUST a word about bright wire. During the very humid weather of the Summer just passed, attention was called to the fact that bright wire was rusting, although stored in apparently dry places. During times of excessive humidity, we find moisture wherever we find air, which means in all warehouses. It is true that the bright wire of today is attacked by rust much quicker than the wire of a few years ago. That is because it is now drawn with less coating or lubricant, resulting in a surface of almost bare steel. Common steel is all subject to corrosion, and since present day plating and welding requirements have largely been responsible for the development of bright, clean wire, the protection of sull coatings or other lubricants against rusting have, therefore, been sacrificed. Research is being conducted daily in many mills, looking for a rust preventative which can be used in the drawing

(*Please turn to page 543*)

Here's another NEW MICRO-WELD Model
Special Low Type
(31" High)

MODEL J-4-S

Micrometer Precision
MICRO-WELD
Trade Mark Reg. U.S. Pat. Off.

Especially designed for galvanizing and other applications where it is desirable to get up close to the reel.

Height to welding dies 23". Round steel base. No corners or edges to catch wires. Frame, heavy rolled steel plates, arc welded. Welding headpieces made from hard bronze. Full swivel casters make it easy to move machine in any direction. Guard rail protects working parts. Annealing dies for use on hard rolled and high carbon material included as regular equipment. Welding capacity, 8 to 18 gauge. Model J-4-S is the last word in convenience and efficiency.

MICRO PRODUCTS COMPANY

CHICAGO, ILL.
20 N. Wacker Drive
Phone State 7468

PEORIA, ILL.
Factory and General Offices

Outstanding Personalties of the Wire Industry

R. S. SIMMONS
Metallurgical Head
Keystone Steel & Wire Co.

THE management of Keystone Steel and Wire company announce that it has been successful in securing the nationally recognized metallurgical authority, Raymond S. Simmons, as the new executive head of the Keystone metallurgical department, and technical experimentation and development.

✦ ✦ ✦

MR. Simmons comes to Keystone with an outstanding background of technical knowledge and accomplishment in his particular sphere of activity. His affiliation with Keystone is pointed to as another step forward in the company's progress.

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MR. Simmons is a graduate of Harvard, and received his A. B. degree in 1913 and his metallurgist degree in 1915; from 1915 to 1919 he served as metallurgist at the Gary Works of the Illinois Steel company; 1919 to 1935, he acted in the capacity of chief of metallurgical and inspection departments of the Pittsburgh Steel company.

✦ ✦ ✦

MR. Simmons is a member of American Society of Testing Materials, American Society of Metals; chairman of rod and wire committee, A. A. S. M. T. C., and member of the technical committee of the American Iron & Steel Institute.

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Trygve D. Yensen Receives Howe Medal

TRYGVE D. Yensen, engineer in charge of the Magnetic Division of the Westinghouse Electric & Manufacturing Company's Research Department, was awarded the Henry Marion Howe medal for 1935 by the American Society of Metals.

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THE other recipient was N. A. Zeigler, former associate of

RAYMOND S. SIMMONS

Dr. Yensen. The award is for joint authorship of a paper entitled "The Magnetic Properties of Iron as affected by Carbon, Oxygen and Grain Size", adjudged to be the best published in the Transactions of the American Society for Metals during 1934.

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DR. Yensen, though born in Drammer, Norway, is a graduate of the University of Illinois where he received the degrees of B. S. in E. E. with the class of 1907, and M. S. in 1911 and in E. E. in 1912. While in college he received preliminary, final and special honors and was elected to Tau Beta Pi, Sigma Xi, and Eta Kappa Nu, honorary fraternities. The California Institute of Technology conferred upon him the degree of Ph.D in physics in 1927.

✦ ✦ ✦

ONE of the world experts in the development of pure metals, his most recent discovery was Hypernik, a new magnetic alloy of extremely high permeability.

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HE is a member of all the leading technical societies concerned with electrical and mechanical engineering and with various sciences.

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EARL MORGAN RICHARDS

Earl Morgan Richards, newly appointed assistant to **Charles M. White,** vice president in charge of operations of the Republic Steel Corporation, has had intensive training in various branches of the steel industry. Mr. Richards is president of the Youngstown section of the American Society of Mechanical Engineers.

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GRADUATING in 1913 from Bucknell University, he spent the next two years with the Westinghouse Air Brake Company, as testing engineer, and then became assistant to Chief Engineer S. W. Dudley, now professor of engineering at Yale University. Then he served two years as assistant to Dr. Walter Turnor, inventor.

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DURING the war, Mr. Richards assisted the Coal Conservation Committee at Pittsburgh in working out methods to reduce coal consumption. Later he went to Washington and worked on railroad matters.

✦ ✦ ✦

FROM 1920 to 1925, he served as vice president of the Swoboda Engineering Company, consulting electrical mechanical engineers of Pittsburgh. From 1925 to 1930, he was chief industrial engineer of the Aliquippa works of the Jones & Laughlin Steel Company, Pittsburgh.

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IN 1930, Mr. Richards joined the Republic organization at Youngstown as chief industrial engineer.

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J. P. DISTLER
Manager of Wire Sales
Republic Steel Corp.

J. P. DISTLER has been appointed Manager of Sale, Wire Division, Republic Steel Corporation, with headquarters at the Grand Crossing plant in Chicago.

✦ ✦ ✦

MR. Distler succeeds **R. W. Hull** whose duties as Assistant Manager of Sales for all Republic products in the Chicago District will now receive his entire time.

Outstanding Personalities of the Wire Industry

PRIOR to his appointment with Republic Steel Corporation, Mr. Distler had been connected with Keystone Steel & Wire Company continuously since 1918. For the past five years he was General Manager of Sales for Keystone, following ten years of experience as Assistant Sales Manager during which time the entire government, railroad and industrial business of Keystone was built under his supervision. For the past two years he has served on the Commercial Committee of the American Iron & Steel Institute.

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WILLIAM STEYTLER
Manager of Wire Sales
Pittsburgh Steel Co.

William Steytler has been appointed manager of sales, steel and wire products, for the Pittsburgh Steel Company, to succeed Hubert F. Hanks, who died August 23rd.

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MR. Steytler has been connected with the company for 22 years and comes from the company's Detroit office where he has been district sales manager. He is a son of Enoch Steytler who was general sales manager of the company for many years.

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H. B. CARPENTER
Manager, Corrigan-McKinney

H. B. Carpenter, for seven years district manager of the Republic Steel Corporation at Youngstown, was appointed manager of the Corrigan-McKinney properties in Cleveland, and will be succeeded in Youngstown by C. H. Elliott, former manager of the Republic properties at Warren. The latter will become manager of the new Warren-Youngstown district, a consolidation of the Republic properties in Youngstown and Warren.

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Mr. Carpenter assumes his new duties at once, with jurisdiction

A. A. NELSON
Asst. General Sales Manager Keystone Steel & Wire Co.

over all Corrigan-McKinney plants, including those in Cleveland, the Newton Steel properties at Monroe, Michigan, and Newton Falls, Ohio, and N. & G. Taylor plant at Cumberland, Md. He joined Republic in 1928, when Republic Steel took over Trumbull Steel Company, at Warren.

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A. A. NELSON
Keystone Steel & Wire Co.

MR. Nelson started with the Company March 9, 1906, worked in the office in the Sales Department from 1906 until 1910. In 1910 he went on the road as a traveling salesman, covering the territories of Missouri, Kansas and Oklahoma. In 1915 he came back into the office as Assistant Sales Manager, under Mr. H. G. Moore, who was made Sales Manager at that time.

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MR. Nelson has had a large experience with the Keystone Company on account of his road experience, and contacts he has made with his customers all over the United States. He has contacted for many years the largest jobbers and dealers doing business with the company, and has been instrumental in establishing and starting many of these connections.

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J. D. JONES
Chief Engineer
Youngstown Sheet & Tube Co.

J. D. JONES, who has been appointed chief engineer of The Youngstown Sheet & Tube Company, was born and raised in Pittsburgh and went to school at Pittsburgh Academy. From the outset he was interested in the steel business. He set out at once to obtain a wide range of experience in the production of steel. He worked in steel plants in Wheeling, Chicago, Buffalo, Pittsburgh and other cities.

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IN 1912 Mr. Jones went to Sault Ste. Marie as chief engineer of the Algoma Steel Company. In 1916 he went to the Gary Works of the Illinois Steel Company as chief engineer, and left there in the latter part of 1919 to return to the Algoma Steel Company at the Soo as general superintendent, later becoming general manager and vice president. He came to The Youngstown Sheet & Tube Company early in August.

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MR. Jones is a member of the American Society of Mechanical Engineers, American Institute of Mining and Metallurgical Engineers, and the Engineering Institute of Canada, the American Iron & Steel Institute and the British Iron & Steel Institute.

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New Directors
Keystone Steel & Wire Co.

William C. Erkert and W. O. Fritzie have been elected directors of Keystone Steel & Wire Company to succeed Hiram E. Todd, whose term expired and W. C. Buchanan, resigned. Other directors whose terms expired this year have been reelected.

A Review of Recent Wire Patents

No. 2,013,211, PROCESS FOR THE PRODUCTION OF EXTENSIBLE ELECTRIC CONDUCTORS, Patented September 3, 1935, by Karl Herkenberg, Oberbarmen-Heckinghausen, Germany.

In the production of electric conductors, the inventor endeavors to maintain the elastic core (rubber thread) under strong tension during operation of braiding around the wire conductor.

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No. 2,013,432, METHOD OF MAKING COILED COILS, Patented September 3, 1935, by Raymond H. Beebe, Glen Ridge, N. J., assignor to Westinghouse Lamp Company, a corporation of Pennsylvania.

More specifically the method covers the production of coiled wires for incandescent electric lights and includes winding a primary helix wire into a secondary helix which comprises, particularly, moving the primary helix thru a predetermined path and in individually separating adjacent turns of the primary helix to produce the secondary.

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No. 2,013,581, WIRE FABRIC, Patented September 3, 1935, by Clarence E. Pink, Cambridge, Md.

It is stated that the construction of this wire fabric belting is such that the belting will maintain its position on the driving pulley and not move laterally.

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No. 2,013,595, FASTENING BETWEEN SPRINGS OR OTHER ELEMENTS, Patented September 3, 1935, by Dean S. Barnard, Hinsdale, Ill., assignor to The Rome Company, Inc., a corporation of New York.

The inventor provides a wire spring to be positioned between adjacent springs of a seat structure or the like, the fastenings being applied by a simple snap action.

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No. 2,013,686, PROCESS OF MAKING INSULATED WIRE, Patented September 10, 1935, by William J. Homer, Hinsdale, Ill., assignor, by mesne assignments, to Associated Electric Laboratories, Inc., Chicago, Ill., a corporation of Delaware.

More specifically, the invention covers the production of telephone switchboard wiring. The wire is first covered with an enamel coating and then artificial silk (rayon) wrapped about the enamel coating, followed by a wrapping of cotton.

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No. 2,013,764, METHOD OF MAKING COILS, Patented September 10, 1935, by John P. Putnam, Boston, Mass., assignor to The Reece Button Hole Machine Company, Boston, Mass., a corporation of Maine.

For the production of concaved wire coils for spherical variometers and the like, the inventor winds a flat annular coil and then subjects the coil to force between suitable dies to produce a concavo-convex coil.

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No. 2,014,214, TELEPHONE CABLE, Patented September 10, 1935, by Arthur G. Smith, Aldwych, London, England, assignor to Western Electric Company, Incorporated, New York, N. Y., a corporation of New York.

Complete Descriptions and Drawings of Patents May Be Had for 25 cents. Address, Wire & Wire Products, 17 East 42nd St., New York.

The conductors are arranged in different empty spaces of the cable so that wires of the same gauge can be used to form high quality circuits of complete metallic return in addition to the circuit in the main part of the cable.

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No. 2,014,611, SPRING SUPPORT FOR UPHOLSTERED FURNITURE, Patented September 17, 1935, by Samuel S. Bernstein, Beverly Hills, Calif.

This support is provided to prevent the fabric bottom of the cushion from sagging.

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No. 2,014,746, METHOD OF MAKING NAILS, Patented September 17, 1935, by Gabriel Robergel, Vincennes, France.

The method covers the production of nails having a head and a cylindrical portion with a ribbed part carrying the point and being larger in diameter than the cylindrical portion.

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No. 2,014,833, COIL WINDING MACHINE, Patented September 17, 1935, by Robert H. Burns, West Orange, N. J., assignor to Radio Corporation of America, a corporation of Delaware.

The machine is particularly adapted for winding heater coils of double helical type for electron discharge devices.

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No. 2,015,063, ELECTRIC CABLE, Patented September 24, 1935, by Charles E. Bennett, Paterson, N. J., assignor to The Okonite-Callender Cable Company, Incorporated, Paterson, N. J., a corporation of New Jersey.

The aim of this inventor is to overcome ionization due to defects in insulation in oil-field electric cables of the solid stranded conductor type.

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No. 2,015,074, MANUFACTURE OF WELDING ROD OR WIRE, Patented September 24, 1935, by Owen L. Howland, Maywood, Ill., assignor by mesne assignments, to Una Welding, Inc., Cleveland, Ohio, a corporation of Delaware.

The method consists of applying a coating of flux to a wire or rod, then removing portions of the flux from a number of clearly defined zones to provide zones for electrical contact extending along the wire.

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No. 2,015,153, WIRE PACKAGE, Patented September 24, 1935, by Edouard A. Nicollet, New York, N. Y., assignor to Paramount Wire Co., Inc., New York, N. Y., a corporation of New York.

More specifically, the inventor provides a means for packaging wire in coils so as to provide an advertising space bridging the inner periphery of the coil.

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No. 2,015,476, ELECTRIC CABLE, Patented September 24, 1935, by Philip Vassar Hunter, London, England, assignor to Callender's Cable and Construction Company Limited, London, England, a British company.

In this wire cable, reinforced sheaths of paper strips are provided for the lead sheaths.

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No. 2,009,820, APPARATUS FOR IMPREGNATING CABLES, Patented July 30, 1935 by George B. Shanklin, Schenectady, N. Y., assignor to General Electric Company, a corporation of New York.

More specifically, the apparatus is adapted for impregnating paper-insulated cables. It is stated that leakage of air into the impregnating tank is prevented and inward leakage, in any case, is a gas which does not adversely affect the impregnating process.

✦ ✦ ✦

Statement of ownership, management, circulation, etc., required by the Act of Congress of March 3, 1933, of Wire & Wire Products published monthly at Washington, N. J., for October 1, 1935.

State of New York, County of New York, ss.: Before me, a Notary Public in and for the State and county aforesaid, personally appeared Richard E. Brown, who, having been duly sworn according to law, deposes and says that he is the Publisher of Wire & Wire Products and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher, Quinn-Brown Publishing Corporation, 17 East 42nd St., N. Y. City; editor, Richard E. Brown, 17 East 42nd St., N. Y. City; managing editor, none; business manager, Richard E. Brown, 17 East 42nd St., N. Y. City.

2. That the owner is: (if owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.) Quinn-Brown Publishing Corporation, 17 East 42nd St., New York City, Jennie R. Baker, Hammonton, N. J., and Leta B. Brown, of 17 East 42nd St., New York City.

3. That the known bondholders, mortgagees, and other security holders owning or holding one per cent of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

RICHARD E. BROWN
(Publisher)

Sworn to and subscribed before me this 17th day of September, 1935.

(SEAL) CHARLOTTE FRANKE,
Notary Public.

Exports and Imports of Wire

Exports of Iron and Steel Wire Products in Aug., 1935 and Aug., 1934
(In gross tons)

	August 1935	July 1935	August 1934
Wire rods	2,692	2,824	1,414
Hoops, bands and strip steel	3,856	3,627	1,840
Plain black or galvanized iron or steel wire	3,900	2,553	3,532
Barbed wire and woven wire fencing	2,801	3,905	3,752
Woven wire screen cloth	96	100	133
Wire rope	260	329	158
Insulated iron or steel wire and cable—see analysis below			
Other wire and manufactures	399	620	323
Wire nails	962	1,277	996
Tacks	32	29	38
Other nails, including staples	236	343	409
Bolts, machine screws, nuts, rivets and washers	469	536	463
Total, these 11 classifications	15,703	16,143	13,058

Imports of Iron and Steel Wire Products Into the United States
(In gross tons)

Concrete reinforcement bars	481	721	142
Hollow bars and drill steel	110	102	.....
Merchant steel bars	93	477	1,673
Wire rods	801	937	720
Barbed wire	1,656	1,390	830
Round iron and steel wire	251	224	187
Telephone and telegraph wire	1	3	41
Flat wire and strip steel	249	65	245
Wire rope and strand	156	138	148
Other wire	127	187	71
Hoops and bands	1,079	1,290	2,323
Nails, tacks and staples	2,112	1,841	428
Bolts, nuts and rivets	1	28	19
Total, these 13 classifications	7,117	7,403	6,827

EXPORTS
INSULATED WIRE AND CABLE, AUGUST, 1935

	Foreign		To U. S. Possessions	
	Pounds	Dollars	Pounds	Dollars
Insulated iron or steel wire and cable	93,252	$ 12,786	2,522	$ 305
Rubber-covered wire	381,827	83,905	66,657	13,774
Copper weatherproof wire	161,376	18,668	33,191	5,730
Copper telephone cable	7,191	1,501	16,000	8,429
Other insulated copper wire	417,269	71,369	317,459	48,773
Nickel-chrome electric resistance wire	16,147	23,059	.....	.....
Total, these 6 classifications	1,077,062	$211,288	435,829	$77,011

Decreased Scrap Shipments Turn Export Trend Downward

DECREASED shipments of scrap iron and steel were sufficient in themselves to turn the export trend downward in August, the 156,685-ton trade veering sharply downward by 49,094 tons from the July total. This drop was practically identical with the 49,490-ton decrease in aggregate iron and steel shipments during the month under review. Decreased exports occurred in 35 classifications of iron and steel products—including the sharp scrap decline—as contrasted with 28 increases, while in one item (horseshoes) the trade remained constant at 21 tons during each month. Following scrap, the outstanding losses were occasioned in steel bars, 3,545 tons, galvanized steel sheets, 2,175 tons, seamless casing and oil-line pipe, 1,132 tons, barbed wire, 924 tons, and iron castings, 345 tons. The outstanding gain was registered in shipments of tin plate and tagger's tin, 2,791 tons, with other increases of moment taking place in ingots, blooms, etc., 1,939 tons, skelp, iron or steel, 1,617 tons, galvanized wire, 1,000 tons, heavy rails, 735 tons, and cast-iron pressure pipe, 426 tons. With the above exceptions, the trade in the other items adhered fairly close to that of the previous month.

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JAPAN continued to be the leading outlet for American iron and steel products during the month under review with participation to the extent of 91,734 tons (its lowest monthly take during any preceding month of this year). The chief items moving in this trade were iron and steel scrap, 82,604 tons, tin plate scrap, 2,720, tin plate and taggers' tin, 2,108, ingots, blooms, etc., 1,512, waste-waste tin plate, 1,378, and wire rods, 999. Canada ranked next with an aggregate of 34,160 tons made up principally of skelp, iron or steel, 12,117, iron and steel scrap, 6,727, black steel sheets, 2,889, ingots, blooms, etc., 2,139, plain shapes 1,859, strip steel, hot rolled 1,446, steel bars, 1,399, and strip steel, cold rolled, 1,061. Italy followed with a total of 33,553 tons of which the predominating items were iron and steel scrap, 33,078, and black steel sheets, 440. The trade with the United Kingdom, 24,391 tons, involved for the most part iron and steel scrap, 23,758, and wire rods, 104. Mexico's varied trade accounted for 7,147 tons; the most important items being iron and steel scrap, 2,412, black steel sheets, 1,099, barbed wire, 460, black steel welded pipe, 514, tin plate and taggers' tin, 456, and galvanized steel sheets, 372. Brazil was the sixth market of the month with purchases totaling 5,641 tons, the chief items moving in this trade being heavy rails, 1,400, tin plate and taggers' tin, 1,042, black steel sheets, 626, barbed wire, 607, and galvanized steel sheets, 595.

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Slight Decline in August Import Trade

PIG iron with a total of 8,568 tons moved into first position as the leading product received on a tonnage basis durng the month, the chief sources being British India, 4,504, Canada, 2,953, and Soviet Russia, 500. Structural shapes, 4,521 tons, followed and came principally from Belgium, 3,379, France, 884, and Germany, 257, while the next item of importance scrap—2,376 tons—was practically all supplied by Canada, 2,356. The total for bars, whether solid or hollow, was 2,329 tons, the chief participants being Belgium, 993, France, 530, Germany, 276, Sweden, 254, and the United Kingdom, 173. Nails, tacks, and

staples, with a total of 2,112 tons supplied mostly by Germany, 1,778, and Belgium, 314, ranked next, while the sixth product was barbed wire, 1,656 tons, of which practically all was supplied by Germany, 1,385, and Belgium, 232.

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Sources of August Imports

CANADA led in the supply of iron and steel products to the United States (from a tonnage standpoint) during August, accounting for 7,135 gross tons of which the chief products were pig iron, 2,953, scrap, 2,356, ferromanganese and spiegeleisen, 1,373, and rails and rail fastenings, 391. Belgium followed with a total of 6,856 tons made up chiefly of structural shapes, 3,379, bars, whether solid or hollow, 993, sheets, skelp, and sawplate, 567, and concrete reinforcing bars, 481. Germany was next with an aggregate of 6,143 tons, the outstanding items being, nails, tacks, and staples, 1,778, barbed wire, 1,385, cotton ties, 1,000, 'other pipe', 348, and bars whether solid or hollow, 276. British India's participation of 4,504 tons was confined entirely to pig iron, while Sweden's share of 2,275 tons was made up chiefly of wire rods, 636, 'other pipe', 261, bars, whether solid or hollow, 254, flat wire and strip steel, 234, sponge iron, 151, and hollow bar and drill steel, 104. France the sixth source, supplied 2,126 tons of iron and steel products to this country, the outstanding items in this trade being structural shapes, 884, 'other hoops', 490, and bars, whether solid or hollow, 276.

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CARD **clothing** receipts continued to rise with respect to quantity, but a value decrease took place when 21,716 square feet valued at $18,503 were supplied by the United Kingdom, 19,679 square feet valued at $15,222, Germany, 1,754 square feet valued at $2,568, and France, 283 square feet valued at $713, representing a **quantity increase** of 3,898 square feet and a **value decrease** of $5,345.

A DECLINE of 10,704 square feet was recorded in receipts of **wire cloth and screening** which amounted to 55,965 square feet. Prominent in the supply of this product were Germany, 39,494 square feet, Canada, 11,042 square feet, and the Netherlands, 4,233 square feet.

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RECEIPTS of **fourdrinier and other paper making** wire at 79,493 square feet continued on the upward movement rising 37,144 square feet above the July trade, and came from Germany, 38,992 square feet, Austria, 25,524 square feet, Sweden, 8,866 square feet, and France, 6,111 square feet.

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WIRE **heddle** receipts picked up 436,000 pieces over the July trade to aggregate 1,693,000 pieces, coming entirely from France, 1,590,000 pieces, and Germany 103,000 pieces.

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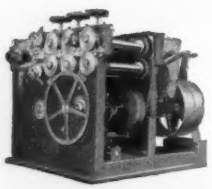
THE downward movement in imports of **wire fencing and netting,** galvanized before weaving continued the total of 191,230

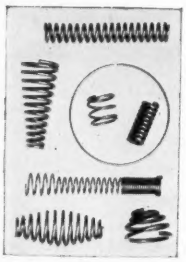
Sleeper & Hartley TRADE MARK

DESIGNERS OF "THE MACHINES THAT PUT THE 'RINGS' IN SPRINGS"

UNIVERSAL SPRING COILERS IN FOURTEEN SIZES!



UNIVERSAL SPRING COILING MACHINES are built in fourteen sizes, handling cold, oil-tempered wire from .004" to ⅝" diameter. Produce an extraordinary variety of spring forms (a few of which are seen at the right) at high speeds. The machines are offered in two types, both of which automatically close and square the end coils as desired. Bulletin Nos. 101 and 101-A give full details.



In addition to many other standard spring and wire coiling machines, spring-hooking, and spring-setting machines we offer:—
Book Spiral Coiling Machines. Bearing Spiral Machines.
Flat Ring Coiling and Edgewise Coiling Machines.
Torsion Spring Machines. Lockwasher Machinery.
Flexible Casing and Flexible Metallic Tubing Machines.
Rolling and Flattening Mills and Take-Ups.
Wire Nail Machines. Wire Reels.
Wire Drawing and Wire Spooling Machinery. Wire Mill Equipment.

square feet decreasing 23,170 square feet under the trade during the previous month. The Netherlands, 190,000 square feet, and Germany, 1,230 square feet, supplied the entire trade. Receipts of the galvanized after weaving grade, 1,347,270 square feet, gained sharply by 696,770 square feet and came chiefly from Belgium, 749,000 square feet, the Netherlands, 581,750 square feet, and Germany, 23,520 square feet.

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Republic Steel to Consolidate Offices at Cleveland

THE General Offices of Republic Steel Corporation will be consolidated in Cleveland about January 1, it was announced by T. M. Girdler, Chairman of Republic.

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THIS will bring approximately 300 Republic employees to Cleveland. It will unite here the company's executive offices now located in the Union Trust Building, the general offices of the former Corrigan, McKinney Steel Co., the general offices now located in Youngstown, and the advertising department now located in Massillon. Republic's move will add to Cleveland's extensive steel manufacturing facilities the headquarters of the third largest steel corporation in the United States.

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THE location of the enlarged executive offices has not yet been announced. It is expected, however, that some of the departments to be brought to Cleveland will be housed in the Corrigan, McKinney office building.

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MR. Girdler pointed out that major Republic manufacturing facilities are located within a radius of 70 miles from Cleveland. These include the Corrigan, McKinney, Upson Nut, and Steel and Tubes plants in Cleveland; important Republic producing units in Youngstown, Canton, Massillon, Warren and Niles; the two Steel and Tubes plants at Elyria; the Union Draw Steel plant at Massillon; the Berger Mfg. plant and the Canton Culvert plant at Canton; and the Newton Steel Plant at Newton Falls.

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REPUBLIC operations outside of Ohio range roughly from New England to the Mississippi and from Canada to Alabama. With the acquisition of Corrigan, McKinney, Republic and subsidiaries will be operating some seventy properties in 35 cities and towns, virtually all of which can be reached by at most an over night ride from Cleveland.

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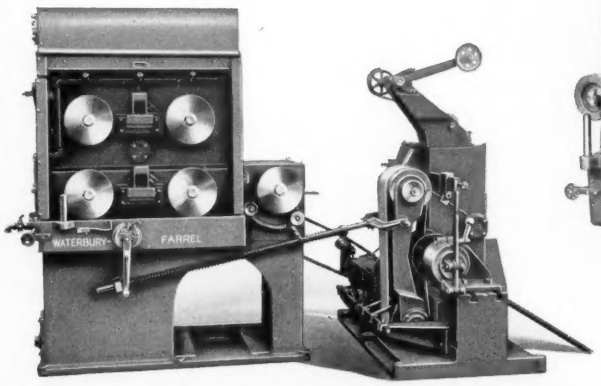
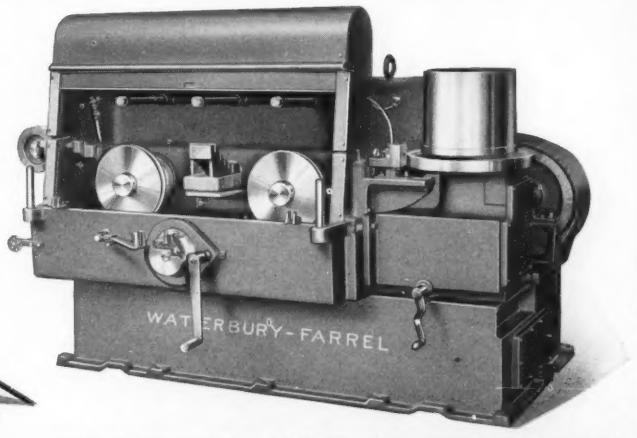
KENNEDY BEESON
Manager of Manufacturers Products Sales Pittsburgh Steel Co.

KENNEDY BEESON has been appointed Manager of Manufacturers' Products Sales for Pittsburgh Steel Company, Pittsburgh, Pa. Mr. Beeson has been connected with Pittsburgh Steel Company for the past five years; first, in production and later in sales capacities.

HIGH-SPEED
UPRIGHT CONE WIRE DRAWING MACHINES



NO. 2-14 DIE MACHINE WITH FLOOR SPOOLER—MAY BE FURNISHED WITH WIRE BLOCK



NO. 3-7 OR 8 DIE MACHINE WITH WIRE BLOCK—12-13 DIES DOUBLE DECK WITH WIRE BLOCK OR FLOOR SPOOLER

Waterbury Farrel Foundry and Machine Company

Waterbury, Connecticut

OFFICES
CLEVELAND CHICAGO PHILADELPHIA

'Round the World With the Wire Industry

Possibility of Inclusion of the Soviet Union in European Steel Cartel

THE possible inclusion of the Soviet Union in the Continental Steel Cartel is indicated in the September 3 issue of the "Metal Bulletin" pointing out the growth of that country as a steel producer, and also advancing the suggestion that **Russia** is preparing the ground for her eventual adhesion to the Steel Cartel.

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Agreement Reached Among Continental Steel Cartel Members With Respect to Barter

MEMBERS of the Continental Steel Cartel who have been operating on the barter system have agreed to keep the volume of this business within a certain ratio of their export quotas, it is understood. This action has been taken in anticipation of the full accession of the Polish works to the selling syndicates in October, for whom export quotas must then be fixed, according to the August 23, 1935 issue of the "The Iron and Coal Trades Review."

✦ ✦ ✦

South African Branch of American Manufacturer Commences Steel Chain Production

TESTS made of the first chains completed by the Vereeniging **South African** branch of an American manufacturer using steel supplied by the Union Steel Corporation of South Africa have proved satisfactory.

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Favorable Conditions Exist in Sidney, Nova Scotia, Steel Industry

CONDITIONS at the Sidney, Nova Scotia, **Canada,** steel plant are considered satisfactory. Operations were resumed on rolling an order received from South Africa, and announcement has been made that on the completion of the order in question, the mill will commence rolling an order for Peru amounting to 4,500 tons to be shipped probably during November. A new production record was established by the blast furnace in August with an output of 17,187 tons. The working force of the blooming mill, billet mill and billet yard, and the operating force on the mills boilers were put on an eight hour shift on September 3rd.

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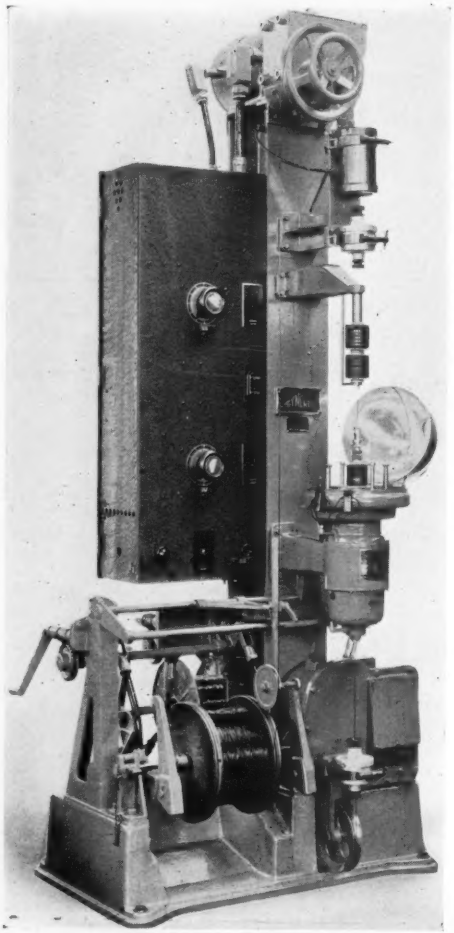
PLANT operations at the Algoma Steel Corporation, Sault Sainte Marie during August were as follows: Three batteries of coke ovens, one blast furnace, four open hearth furnaces, and two blooming mills; the rail mill, the 35″ mill and the 32″ mill running on eight-hour shifts, the 12″ mill on two eight hour shifts from August 5 to the end of the month, and on single shift from July 20 to August 5, with double shift on the 18″ mill during all but three days

IMPOSSIBLE ?
SYNCRO DOES IT!



THROUGH the use of a new ingenious method of serving, Syncro economically applies all the available webb and strand insulating materials including Cellophane, cellulose acetate and fine papers.

SYNCRO

Gives Greater Production at Lower Cost
FOR COMPLETE DETAILS ADDRESS

SYNCRO MACHINE CO.

187 SYLVAN AVE. NEWARK, N. J.

'Round the World With the Wire Industry

of the month. An average of 1,750 men were employed at the plant during the period under review.

✦ ✦ ✦

New Type of Wire Net Produced in Rumania

THE "Metallurgia" works of Bucharest, **Rumania,** has brought out a new product, namely, wire net made of perforated iron sheets, having a thickness of two or three millimeters, which is offered at the basic price of 60 lei per square meter.

✦ ✦ ✦

Barter Transactions Important in German Export Increase of Wire and Wire Products

EXTENSIVE barter transactions with the United States and leading Latin American countries are stated to be obviously responsible for a marked increase in **German** exports of wire and wire products during the initial 6-month period of this year as compared with the comparable period of last year. Shipments during the period under review totaled 152,722 metric tons, as compared with 118,647 tons during the first half of last year. An unusual gain was noted in barbed wire shipments while gains were also shown in wire nails and staples, wire netting, wire rope and wire strand, wire, hot rolled or forged, and wire, cold rolled or drawn, unfinished. Exports of wire to the United States during the period under review more than doubled when compared with the comparable period of last year having increased from 9,320 tons to 21,860 tons.

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Peruvian Wire Rope Market Dominated by the United Kingdom

THE United States led in the supply of wire rope and cable for general uses to **Peru** in 1930, 1931 and 1932 with the United Kingdom supplying the bulk of rope for naval use, in those years. The British product in the ensuing two years assumed first rank aided by the advantage of having a long established reputation in the market with prices equal or slightly below American quotations. Present competitive conditions make the outlook for American wire rope in this market rather difficult and although it has a recognized standing, it is pointed out that there is still some ignorance as to its merit. The suggestion has been made that some well conducted advertising campaign may be of assistance in overtaking the advantage gained by the British product. With respect to the keen German competition the question is exclusively one of price and the local importers are of the belief that American products would be preferred over those of Germany if quotations did not exceed the German price by too great a margin.

(*Please turn to page 545*)

OXYGEN FREE ● HIGH CONDUCTIVITY

OFHC
REG. U.S. PAT. OFF.

COPPER

Uniform in all its properties

✦

Free from Cuprous Oxide and other Foreign Inclusions.

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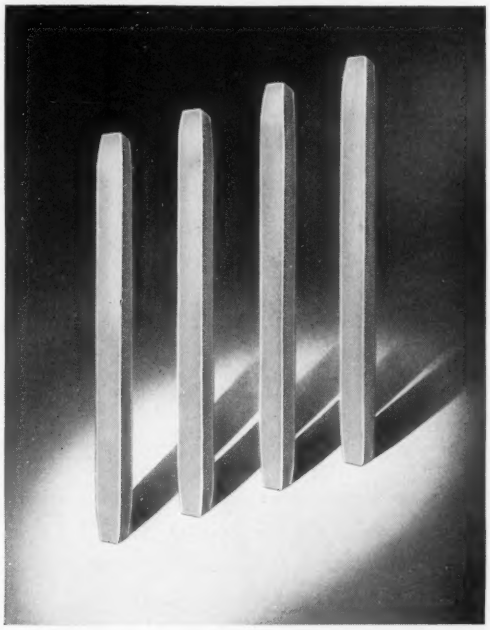
Combines Toughness with High Ductility.

Copper *that*



produces Better Wire Economically

Better wire can be produced from OFHC Copper because there have been climinated from it fundamental sources of trouble in wire drawing. For example, in fine wire of various kinds, freedom from oxide inclusions in the drawn wire reduces the chances of surface and internal defects. In heavy sections, too, such as "bull ring" wire and strip, the properties of this special copper offer assured advantages.

OFHC Copper is produced under precisely controlled conditions and cast in water-cooled vertical molds with resultant high density and bar-for-bar uniformity.

Wire manufacturers, regardless of the tonnage or the kind of wire they produce, should investigate the merits of OFHC Copper.

Send your inquiries to us or to your regular suppliers.

UNITED STATES METALS REFINING CO.

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Subsidiary of The American Metal Co., Ltd., 61 Broadway, New York, N. Y.

The Wire Association — 1935-'36

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Assistant to Vice-President,
Wickwire-Spencer Steel Co.,
New York, N. Y.

President
JOHN MORDICA
Supt., Rod and Wire Works,
Bethlehem Steel Company,
Sparrows Point, Md.

Vice-President
E. W. CLARK
Managing Engineer,
Wire Dept., General Electric Co.,
Schenectady, N. Y.

RICHARD E. BROWN, Secretary

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John C. Callaghan, Works Manager, Canada Works, Steel Co. of Canada, Hamilton, Ontario, Canada.

E. W. Clark, Mechanical Engineer, Wire and Cable Division, General Electric Co., Schenectady, N. Y.

Ralph K. Clifford, General Supt., Continental Steel Corp., Kokomo, Indiana.

Paul R. Fast, Plant Supt. Belden Manufacturing Company, Chicago Illinois.

L. D. Granger, Asst. to Vice-President, Wickwire-Spencer Steel Co., 41 East 42nd Street, New York, N. Y.

M. A. Kent, Asst. Gen. Works Manager, General Cable Corp., White Plains, N. Y.

Kenneth B. Lewis, Consulting Engineer, 43 Midland Street, Worcester, Mass.

John Mordica, Supt. Rod and Wire Wks., Bethlehem Steel Company, Sparrows Point, Maryland.

W. D. Pierson, Secretary, Waterbury Farrel F'dry & Mach. Co., Waterbury, Conn.

R. S. Simmons, General Metallurgist, Keystone Steel & Wire Co., Peoria, Illinois.

F. A. Westphal, Supt., Wire Mills, Sheffield Steel Corp., Kansas City, Mo.

✦ ✦ ✦

Attendance List
1935 Meeting
Chicago, Ill., Sept. 30-Oct. 4

AKIN, W. M., Assistant to President, Laclede Steel Company, St. Louis, Missouri.

ANJESKEY, A. F., Sales Manager, Cleveland Tramrail Division, Cleveland Crane & Engineering Co., Cleveland, Ohio.

APPEL, BERNARD P., Factory Manager, Chandler Products Corp., Cleveland, Ohio.

ARGANBRIGHT, A. B., Special Agent, Wheeling Steel Corp., Portsmouth, Ohio.

ATKINSON, LAURENCE, Assistant Supt., Frost Steel and Wire Co., Ltd., Hamilton, Ontario, Canada.

BAILEY, C. A., Engineer, General Electric Co., Schenectady, N. Y.

BAKER, W. S., Sales, Carboloy Co., Inc., Chicago, Ill.

BALDRIDGE, W. M., Engineer of Tests, Laclede Steel Co., St. Louis, Missouri.

BARKER, L. B., Metallurgist, General Electric Co., Schenectady, N. Y.

BARR, JOHN H. S., Sales Engineer, Penna. Salt Mfg. Co., Philadelphia, Pa.

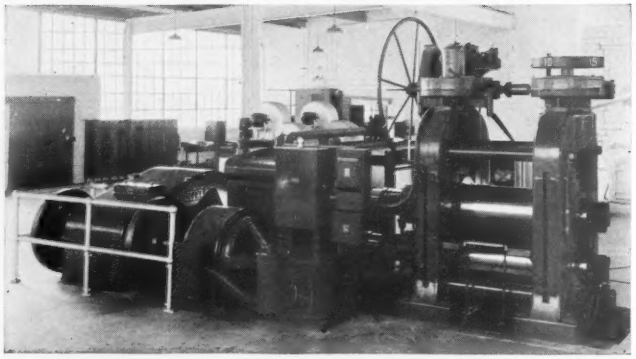
BEAMAN, P. A., Manager, Wire Machinery Department, Morgan Construction Co., Worcester, Mass.

BEARDSLEE, K. R., District Manager, Carboloy Co., Inc., Pittsburgh, Pa.

BECHTEL, THEO. B., Engineer, Electric Furnace Co., Salem, Ohio.

BECK, W. A., Sales, The Dobeckmun Co., Cleveland, Ohio.

FARREL ROLLING MILLS



for rod, strip or sheet

Farrel Rolling Mills are made in a wide range of sizes, designed for any specific purpose and constructed with the greatest care and precision.

Improved design and construction provide many advanced features which bring about more satisfactory operating conditions, increase output and lower operating and maintenance costs . . . . .

ROLLS—Forged alloy steel, hard surface chilled alloy iron or plain chilled iron.

BEARINGS—Anti-friction roller type, phenolitic, bronze or babbitt.

SCREW DOWN—Single or double motor, single or double handwheel, or wrench.

SPINDLES AND COUPLINGS — Universal type, splined or four-pod wabbler.

DRIVE—Reduction unit and pinion stand made integral or as separate units connected by flexible coupling. Sykes continuous tooth herringbone gears and pinions fully enclosed and running in oil. Anti-friction or plain bearings.

UNIT CONSTRUCTION—All units on one bedplate, or separate bed construction.

Farrel engineers will welcome the opportunity to confer with you on your rolling mill requirements and assist in the decision as to which of the alternative construction features are best suited to your individual needs.

Farrel Rolling Mill Equipment also includes: Chilled Iron and Special Alloy Iron or Steel Rolls—Universal Mill Spindles—Rod Mill Tables and Manipulating Equipment—Rod Coilers—Lead Presses for Pipe or Rod—Roll Grinding Machines—Roll Calipers—Gears and Pinions—Drives up to 10,000 H. P.

FARREL-BIRMINGHAM
Company, Inc.
38 Main St., Ansonia, Conn.

The Wire Association — 1935

THE Wire Association is a non-profit organization of wire mill executives, superintendents and foremen. It also includes plant engineers, traffic men, credit men, salesmen, and all others engaged in the wire industry, together with manufacturers, and other interested people who have something to sell to the wire mill or some service to render for pay.

✦ ✦ ✦

ITS specific purpose is to improve production methods and afford a clearing house for ideas on management problems, technical problems, and research work in all phases of practical wire drawing and wire working, and to develop and maintain friendly relations among the members.

✦ ✦ ✦

THERE are separate divisions for all the separate major interests in the wire industry, steel, iron, brass, copper, alloy, and precious metals, together with divisions relating to drawing, fabricating, forming, spring making, wire cloth, wire rope, insulated wire, electric wire and cable and all other forms of wire and wire products.

✦ ✦ ✦

BEESON, J. K., Manager,
Manufacturers Products Sales,
Pittsburgh Steel Co.,
Pittsburgh, Pa.

BISSETT, GEORGE, President,
Bissett Steel Co.,
Cleveland, Ohio.

BLOUNT, H., Development Engineer,
Western Electric Co.,
Baltimore, Md.

BLOUNT, WILLIAM H., Treasurer,
Sleeper & Hartley, Inc.,
Worcester, Mass.

BOESHORE, JAY F., Treasurer,
Rea Magnet Wire Co., Inc.,
Fort Wayne, Indiana.

BOLL, JOHN K., Sales Manager,
Wheeling Steel Corporation,
Wheeling, W. Va.

BONDS, ALBERT,
American Steel & Wire Co.,
Cleveland, Ohio.

BRADFORD, A. N., Manager,
Russell Burdsall & Ward Bolt & Nut Co.,
Rock Falls, Ill.

BRALEY, DR. S. A.,
Mellon Institute of Industrial Research,
Pittsburgh, Pa.

BROWN, HUGH E., Director of Research,
W. S. Tyler Co.,
Cleveland, Ohio.

BROWN, R. W.,
Wilson Steel & Wire Co.,
Chicago, Ill.

BUCHANAN, D. D., Assistant General Mgr.,
Union Drawn Steel Co.,
Massillon, Ohio.

BURNS, RICHARD, Assistant Metallurgist,
Indiana Steel & Wire Co.,
Muncie, Indiana.

BYSTRICKY, JOSEPH, Engineer,
Stewart-Warner Corp.,
Chicago, Ill.

CALLAGHAN, J. C., Works Manager,
Canada Works,
Steel Co. of Canada, Ltd.,
Hamilton, Ontario, Canada.

CARL, A. F., Sales Engineer,
Cleveland Tramrail Division,
Cleveland Crane & Engineering Co.,
Wickliffe, Ohio.

CARNAHAN, H. B., Assistant Works Mgr.,
Canada Wire & Cable Co.,
Toronto, Ontario, Canada.

CASEY, AUSTIN, Sales Engineer,
Syncro Machine Co.,
Newark, N. J.

CHRISTIN, R. E., Metallurgist,
Columbus Bolt Works Co.,
Columbus, Ohio.

CLARK, E. W., Mechnical Engineer,
Wire & Cable Divisions,
General Electric Co.,
Schenectady, N. Y.

CLARK, HERBERT B., Vice President,
Union Wire Die Corp.,
New York, N. Y.

CLIFFORD, R. K., General Superintendent,
Continental Steel Corporation,
Kokomo, Indiana.

COCHRAN, I. G., Superintendent,
Wire Mill,
Laclede Steel Co.,
Alton, Ill.

COHN, RALPH F., Secretary & Factory Mgr.,
Reynolds Wire Co.,
Dixon, Ill.

COPPICK, J. C., Mgr. St. Lawrence Wire Div.,
Dominion Steel & Coal Corp.,
Montreal, Canada.

CONLEY, GERALD C., Wire Mill Supervisor,
Packard Electric Division,
General Motors Corporation,
Warren, Ohio.

(*Please turn to page 536*)

"What Do You Mean You Can Cut Rod Baking Costs in Half?"

This is a strong statement. It is backed by operating data collected under almost every possible condition that positively points to savings up to 50% through the use of Morrison rod baking equipment.

How does this come about? Through modernized and patented design, radical economies in fuel per hour are effected. These same advanced principles also cut a large amount of time off the period required by a charge to reach full heat. Therefore, one has a condition of lower gross fuel per hour with greater gross tonnage.

These are not mere claims—they are substantiated facts. Not one or two, but scores of Morrison rod baking ovens are daily turning back savings of 50% to their owners. Many have paid for themselves within their first year of service.

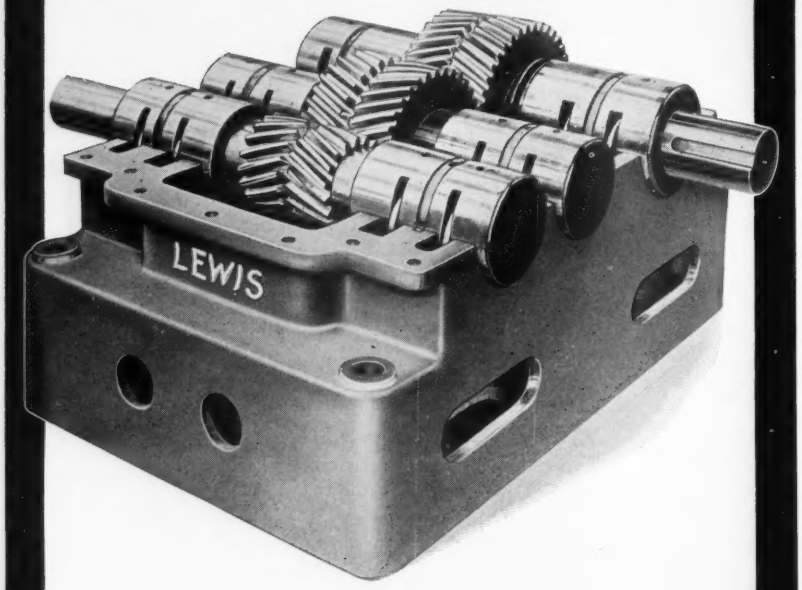
Furthermore, savings do not stop here. The perfect atmospheric control and stability of temperature within 1°F. produces rod that works easily and uniformly in the dies. No rusty or squeaky wire. No vexing production delays. This last advantage is but a by-product on which you may place your own valuation.

Do just this one thing — investigate Morrison rod baking equipment. It may open up a surprising opportunity. Let us lay the facts before you which may mean a saving of half your present rod baking costs. All it takes is a card or a short letter. Get it in the mail today!

THE MORRISON ENGINEERING COMPANY, INC.

5005 Euclid Avenue, Cleveland, Ohio

LEWIS HIGH SPEED GEAR SET



FOR CONTINUOUS ROD MILL

Lewis High Speed Gear Sets are in use where quality and efficiency really count. The largest and most up-to-date rod mill unit in the world utilizes Lewis Gear Sets for driving its roll stands.

Lewis gear housings are of two piece type with special alloy forged steel herringbone cut tooth gears running in babitted shell type or roller bearings. One Lewis gear set is used for driving two roll stands which is a special feature for controlling roll speeds when driven by either individual motors or bevel gear drives. Lewis gear sets are totally enclosed and gears and bearings run continuously in oil.

Lewis Engineers will gladly cooperate with you in designing special machinery to meet your problems.

LEWIS

PITTSBURGH, PA.

LEWIS FOUNDRY & MACHINE CO.

Attendance List 1935 Meeting

(*Continued from page 535*)

CRAIG, GEORGE L., Research Engineer, Calumet & Hecla Consolidated Copper Co., New York, N. Y.
CRANE, C. C., Metallurgist, Republic Steel Corp., Chicago, Ill.
CRAPO, FRED M., Vice President, Indiana Steel & Wire Co., Muncie, Indiana.
DALLAS, R. K., District Manager, Central Illinois Light Co., DeKalb, Illinois.
DENNIS, WALTER, District Manager, Vascoloy-Ramet Division, Vanadium Alloys Steel Co., Pittsburgh, Pa.
DOBBRODT, A. F., Sales Dept., Carboloy Co., Chicago, Ill.
DONALD, GEO. E., Superintendent, Canada Wire & Iron Goods Co., Hamilton, Canada.
DOVE, A. B., Chemical Engineer, Steel Co. of Canada, Ltd., Hamilton, Ontario, Canada.
EDICK, H. L., Superintendent, Wickwire Brothers, Cortland, N. Y.
ELIAS, H. W., Assistant Manager, Firthaloy Division, Firth Sterling Steel Co., Pittsburgh, Pa.
ENGLE, E. W., Metallurgist, Tungsten Tool Co., New York, N. Y.
ESAU, G. WALTER, Metallurgical Engineer, E. F. Houghton & Co., Chicago, Ill.
FANTONE, C. B., President, Syncro Machine Co., Newark, N. J.
FAST, PAUL R., Plant Superintendent, Belden Manufacturing Co., Chicago, Ill.
FISHER, E. J. P., Metallurgist, Republic Steel Corp., Chicago, Ill.
FOEGE, H. W., Sales Representative, Keystone Steel & Wire Co., Detroit, Michigan.
FRASER, ROBERT M., Plant Engineer, General Cable Corp., White Plains, N. Y.
FREELAND, O., Superintendent, Anaconda Wire & Cable Co., Muskegon, Michigan.
FROMMANN, M. H., Townsend Co., New Brighton, Pa.
GARDNER, W. H., Gen. Sales Manager, Keystone Steel & Wire Co., Peoria, Ill.
GILMOUR, JOHN, General Foreman, Belden Manufacturing Co., Chicago, Illinois.
GOVOLA, MICHAEL, Foreman, Copperweld Steel Co., Glassport, Pa.
GRANGER, L. D., Assistant to Vice President, Wickwire Spencer Steel Co., New York, N. Y.
GRASSELL, P. W., President & Treasurer, Wilson Steel & Wire Co., Chicago, Illinois.
GREAVES, R. K., Detroit Manager, Ekstrand & Tholand, New York, N. Y.
HAMAKER, R. L., District Manager, American Lime & Stone Co., New York, N. Y.
HAMMERSTEIN, H. K., Chief Engineer, Broderick-Bascom Rope Co., St. Louis, Mo.
HANAUER, DARWIN, Factory Manager, Nachman Spring Filled Corp., Chicago, Ill.
HANEMANN, WM., Owner, Eastern Wire Die Co., Jersey City, N. J.
HARDING, R. L., Chief, Metal & Minerals Division, Department of Commerce, Washington, D. C.
HARRISON, CHAS. E., Assistant Sales Mgr., Steel Co. of Canada, Ltd., Hamilton, Ontario, Canada.
HARRISON, N. C., Vice President, Atlantic Steel Co., Atlanta, Ga.
HART, FRANK E., Mill Manager, Anaconda Wire & Cable Co., Marion, Indiana.
HAUGER, FLOYD, Superintendent, Wilson Steel & Wire Co., Chicago, Illinois.

HAYWARD, C. K., Metallurgist,
Russell Burdsall & Ward Bolt & Nut Co.,
Rock Falls, Illinois.
HILL, WM. E., Superintendent,
Russell Burdsall & Ward Bolt & Nut Co.,
Sterling, Illinois.
HITCHCOCK, WM. E., President,
Atlantic Wire Co.,
Branford, Conn.
HOLMES, ALVIN W., General Foreman,
Indiana Steel & Wire Co.,
Muncie, Indiana.
HOLMQUIST, C. W., Plant Engineer,
Copperweld Steel Co.,
Glassport, Penna.
HOOVER, J. R., Assistant Manager,
Chemical Sales Division,
B. F. Goodrich Co.,
Akron, Ohio.
HOPE, RALPH B., Superintendent,
Rod and Wire Department,
Wheeling Steel Corp.,
Portsmouth, Ohio.
HOPKINS, JOSEPH H., Engineer,
Packard Electric Co.,
Warren, Ohio.
HORMILE, E. M., Sales Dept.,
Keystone Steel & Wire Co.,
Chicago, Ill.
HUBBARD, E. J., President,
Hubbard Spool Co.,
Chicago, Ill.
HUFFMAN, J. F., Sales,
Union Wire Die Co.,
New York, N. Y.
HUSSEY, R. M., Superintendent,
Wire Department,
Jones & Laughlin Steel Corp.,
Aliquippa, Pa.
HYNDMAN, H. M., Superintendent,
Dominion Iron & Steel Div.,
Dominion Steel & Coal Corp., Ltd.,
Sydney, Novia Scotia, Canada.
JANSSEN, MARTIN L., Foreman,
Russell Burdsall & Ward Bolt & Nut Co.,
Sterling, Illinois.
JOHNSON, A. H., Vice President,
Worcester Wire Works,
Division National Standard Co.,
Worcester, Mass.
JOHNSON, H. E., Superintendent,
Chicago Steel & Wire Co.,
Chicago, Ill.
JUDY, P. R., Chief Chemist,
Indiana Steel & Wire Co.,
Muncie, Indiana.
KASTIEN, E. P.,
Peoria, Ill.
KELLOGG, C. A., Chief Metallurgist,
Continental Steel Corporation,
Kokomo, Indiana.
KEMPTON, E. W., Educational Director,
American Steel & Wire Co.,
Cleveland, Ohio.
KENNY, H. C., Metallurgist,
Calumet & Hecla Consolidated Copper Co.,
Lake Linden, Michigan.
KENT, M. A., Assistant General Works Mgr.,
General Cable Corporation,
White Plains, N. Y.
KEYSER, HARRY, Foreman,
Kay Manufacturing Co.,
Brooklyn, N. Y.
KITSELMAN, HARRY L., Secretary,
Indiana Steel & Wire Co.,
Muncie, Indiana.
KNOLL, W. F., General Superintendent,
Jas. Pender & Co., Ltd.,
Saint John, N. B., Canada.
KNOX, J. D., Associate Editor,
"Steel",
Cleveland, Ohio.
KOCH, A. C., Salesman,
Van Schaack Chemical Co.,
Chicago, Ill.
KRUEGER, E. W., Salesman,
Keystone Steel & Wire Co.,
Chicago, Ill.
KUHNLE, L. V., Assistant Mgr. Wire Sales,
Youngstown Sheet & Tube Co.,
Youngstown, Ohio.
LaPORTE, C. W., Vice President,
Keystone Steel & Wire Co.,
Peoria, Illinois.
LARSON, E. W., Engineer,
Western Electric Co.,
Chicago, Ill.
LARSON, HESSLER,
Matthiessen Hegeler Zinc Co.,
La Salle, Ill.
LEWIS, KENNETH B., Consulting Engineer,
Worcester, Mass.
LONGWELL, JAMES R., Field Engineer,
Carboloy Co., Inc.,
Detroit, Mich.
MACKAY, W. ROY, Chief Inspector,
Bethlehem Steel Co.,
Sparrows Point, Md.
MacPHERSON, R. P., Salesman,
Schenectady Varnish Co.,
Fort Wayne, Indiana.

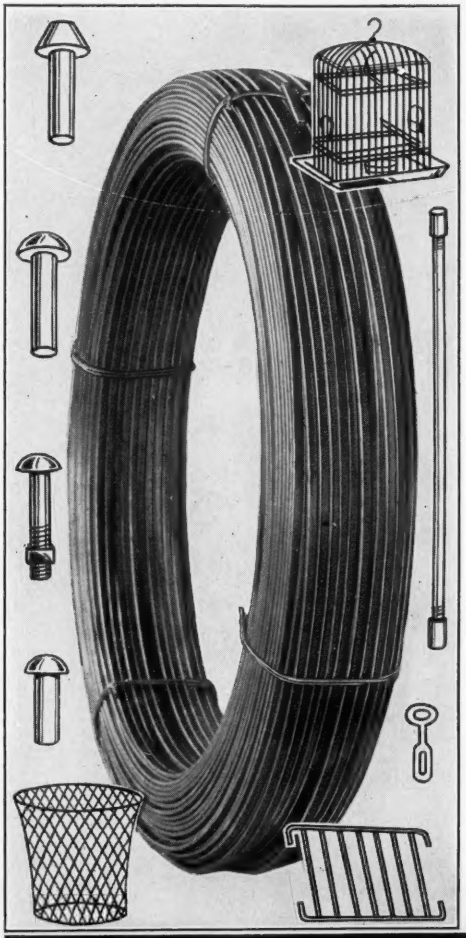
(*Please turn to page 538*)

★CONTINENTAL WIRE

to Your Specifications

STRENGTH • TEMPER • FINISH

● Continental Wire is made from Basic Open Hearth Steel, either in plain carbon steel, copper-bearing steel, or Konik Metal. It is regularly supplied to meet a wide range of requirements and our metallurgists are always prepared to assist manufacturers in stepping-up production, reducing waste, and improving the quality of their wire products.



FINISHES

Bright, Extra Bright, Light, Medium or Heavy sull. Oiled and many other finishes for special needs.

COATINGS

Galvanized, Standard, Satin Finish, and "Flame Sealed."

ANNEALED

Pot annealed, Box annealed, and Lead annealed.

PROCESSED

To your specifications.

TEMPERS

Hard, Medium hard, or Soft.

SHAPES

Round, Square, Flat, Triangular, Oval, Half-round, Half-oval, and many other shapes.

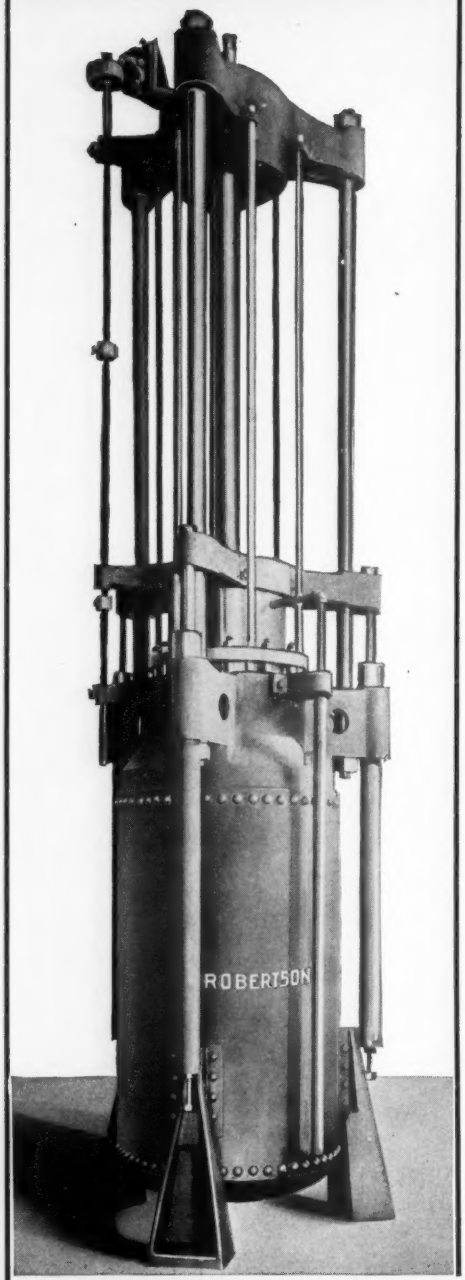
Continental wire is furnished straightened and cut, or in coils, to best meet the requirements of manufacturers.

CONTINENTAL STEEL CORPORATION

KOKOMO, INDIANA

Manufacturers of Billets, Rods, Wire, Barbed Wire, Nails; Lawn, Chain-Link, Diamond Mesh, Farm and Poultry Fence; Gates; Black, Galvanized, Galvannealed and Special Coated Sheets; Galvanized Roofing; also "Seal of Quality" Roofing and Kindred Products.

The ROBERTSON HYDRO-PNEUMATIC ACCUMULATOR



Helps Cut Production Costs . . . Excellence of design, coupled with the precision of its construction assures minimum production and maintenance costs. Over its long life it will pay for itself, again and again, in operating economies.

Occupies Less Floor Space . . . Because it utilizes its air tank as a base, this accumulator takes up very little space and requires no special heavy foundation.

Requires Only 175 lbs. Working Pressure . . .

This unusually low operating pressure is consistently maintained in cylinder and air tank by an automatic auxiliary air compressor.

Skillfully Designed Accurately Built . . .

All parts of the Robertson Accumulator are accurately made of the finest basic materials . . . and incorporated in a design that is noteworthy for many distinctive features.

Robertson have been specialists in the manufacture of hydraulic equipment for 75 years . . . and all Robertson machines are built to give the most economical performance and the longest efficient service.

Write For Details . . .

We are prepared to **prove** that the Robertson Accumulator is superior. No obligation, of course.

John ROBERTSON CO. INC.

Pioneers~Since 1858

125-37 Water Street Brooklyn, N. Y.

Attendance List 1935 Meeting

(*Continued from page 537*)

MARTIN, F. L., Salesman,
American Lime & Stone Co.,
Pittsburgh, Pa.

MELVILLE, NORMAN J., Special Rep.,
Pittsburgh Steel Co.,
Pittsburgh, Pa.

MEYER, F. W., Superintendent Wire Mill,
W. S. Tyler Company,
Cleveland, Ohio.

MORDICA, JOHN, Supt., Rod & Wire Mills,
Bethlehem Steel Co.,
Sparrows Point, Md.

MORGAN, PHILIP M., Treasurer,
Morgan Construction Co.,
Worcester, Mass.

MORITZ, JOHN A., General Superintendent,
Mid-States Steel & Wire Co.,
Crawfordsville, Indiana.

MORRISON, J. R., President,
Morrison Engineering Co., Inc.,
Cleveland, Ohio.

MORROW, J. G., Metallurgical Engineer,
Steel Co. of Canada, Ltd.,
Hamilton, Ontario, Canada.

MOSSBERG, FRANK, President,
Mossberg Pressed Steel Corp.,
Attleboro, Mass.

MUCKLEY, D. S., Superintendent Wire Mills,
Colorado Fuel & Iron Co.,
Pueblo, Colo.

MUELLER, PAUL M., Engineer,
Revere Copper & Brass, Inc.,
New York, N. Y.

MURASHEFF, B. A., Consulting Engineer,
Moscow, U. S. S. R.

MURRAY, KENNETH, Sales Department,
Republic Steel Corp.,
Chicago, Ill.

McCARTHY, B. L., Metallurgist,
Wickwire Spencer Steel Co.,
Buffalo, N. Y.

McGOWAN, C. L., Superintendent,
Wire Departments,
Atlantic Steel Co.,
Atlanta, Ga.

McILVRIED, E. J., Vice President,
Vaughn Machinery Co.,
Cuyahoga Falls, Ohio.

NACHMAN, FRED A., SR., President,
Nachman Spring-Filled Corp.,
Chicago, Illinois.

NEHRING, PAUL A., President,
Nehring Electrical Works,
DeKalb, Illinois.

NEUHAUS, R., President,
Nukem Products Corp.,
Buffalo, N. Y.

OESTERHELD, J. M., Foreman,
Belden Manufacturing Co.,
Chicago, Ill.

PEARSON, O. A., Wire Superintendent,
Continental Steel Corp.,
Kokomo, Indiana.

PENROD, R. E., Engineer of Tests,
Bethlehem Steel Co.,
Johnstown, Pa.

PETERS, W. A., Metallurgist,
Laclede Steel Co.,
Alton, Illinois.

PIERCE, R. C., Chief Engineer,
National Standard Co.,
Niles, Michigan.

PIERSON, W. D., Secretary,
Waterbury Farrel Foundry & Mach. Co.,
Waterbury, Conn.

PIRK, G. W., Metallurgist,
General Cable Corp.,
Rome, N. Y.

POTTER, EARL R., Superintendent,
Standard Wire Division,
California Wire Cloth Co.,
South San Francisco, Calif.

RASMUSSEN, H. P., Manager,
Gehnrich Corporation,
Chicago, Ill.

RATZER, WM., Plant Engineer,
Belden Mfg. Co.,
Chicago, Ill.

READING, R. L., Wire Mill Engineer,
Belden Manufacturing Co.,
Chicago, Illinois.

RENFER, E. A., Manager,
Anaconda Wire & Cable Co.,
Sycamore, Ill.

RICHARDS, WALTER A.,
Wire Mill Machinery,
Chicago, Ill.

RINEK, F. B., Chemical Engineer,
Western Electric Co.,
Chicago, Illinois.

ROLLE, SIDNEY, Assistant Manager,
U. S. Metals Refining Co.,
New York, N. Y.

ROTH, RALPH B., Purchasing Agent,
Ludlow Saylor Wire Co.,
St. Louis, Missouri.

SACKS, JAMES J., Production Manager,
Chicago Steel & Wire Co.,
Chicago, Illinois.

SALMON, B. P., Salesman,
Bissett Steel Co.,
Chicago, Ill.

SAXON, J. P., Factory Manager,
Federal Screw Co.,
Detroit, Michigan.

SCHMID, A. A., Purchasing Agent,
Pheoll Manufacturing Co.,
Chicago, Illinois.

SCHOLL, CHESTER O., Engineer,
Belden Manufacturing Co.,
Chicago, Illinois.

SCHUELER, J. L., Superintendent,
Steel and Wire Division,
Continental Steel Corp.,
Kokomo, Indiana.

SCHUSLER, F. P., Manager,
Industrial Sales,
Keystone Steel & Wire Co.,
Peoria, Ill.

SEYMOUR, LE ROY D., Metallurgist,
Youngstown Sheet & Tube Co.,
Youngstown, Ohio.

SHORE, C. W., Assistant Superintendent,
Northwestern Barb Wire Co.,
Sterling, Illinois.

SIMMONS, R. S., General Metallurgist,
Keystone Steel & Wire Co.,
Peoria, Illinois.

SOMERVILLE, W. E., Engineer,
W. E. Somerville & Co.,
Coal City, Illinois.

STACHOURAK, I. V., Foreman,
Matthiessen & Hegeler Zinc Co.,
La Salle, Ill.

STUMPF, G. A., Metallurgist,
Research Department,
Timken Roller Bearing Co.,
Canton, Ohio.

TATNALL, R. R., Engineer,
Wickwire Spencer Steel Co.,
Worcester, Mass.

TAYLER, THOMAS D.,
Bliss & Laughlin, Inc.,
Harvey, Illinois.

TESSMANN, A. H., Sales Department,
Nehring Electrical Works,
DeKalb, Illinois.

TIMBERLAKE, J. E., Wire Department,
Jones & Laughlin Steel Corp.,
Pittsburgh, Pa.

TRANTIN, E., Metallurgist,
Stewart-Warner Corp.,
Chicago, Ill.

TROTTER, CHAS. D., Superintendent,
Reynolds Wire Co.,
Dixon, Illinois.

TREUTING, HERERT R., Superintendent,
Amaloy Division & Chemical Engineer,
American Machine & Foundry Co.,
Brooklyn, N. Y.

URCH, W. T., Manufacturing Engineer,
Western Electric Co.,
Chicago, Illinois.

VAUGHN, L. A., President,
Vaughn Machinery Co.,
Cuyahoga Falls, Ohio.

WALTMAN, WOLF, Plant Engineer,
Northwestern Barb Wire Co.,
Sterling, Illinois.

WARD, C. T., Assistant Superintendent,
Bethlehem Steel Co.,
Johnstown, Pa.

WARNER, WALFRID, Inspector,
Metallurgical Department,
Inland Steel Co.
Chicago, Ill.

WEBB, E. H., President,
Webb Wire Works,
New Brunswick, N. J.

WEISS, J. G., Physical Test Supervisor,
Keystone Steel & Wire Co.,
Peoria, Illinois.

WEISSELBERG, ARNOLD,
Construction Engineer.
Langbein Pfanhauser Works,
Leipzig, Germany.

Westphal, F. A., Superintendent,
Sheffield Steel Corp.,
Kansas City, Mo.

WHYTE, R. B., General Superintendent,
MacWhyte Company,
Kenosha, Wisc.

WINKLER, L. H., Metallurgical Engineer,
Bethlehem Steel Co.,
Bethlehem, Pa.

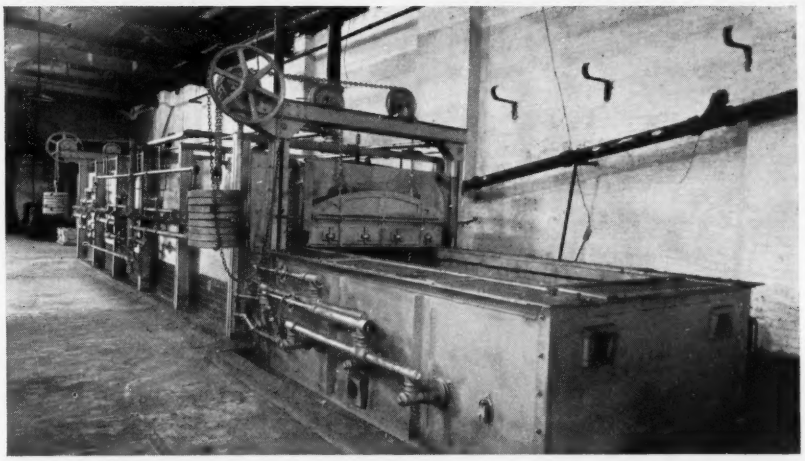
WOODHEAD, R. R., Research Engineer,
John A. Manning Paper Co., Inc.,
Troy, New York.

YORT, A. O., Superintendent,
Wire & Tack Mills,
Republic Steel Corp.,
Chicago, Ill.

YOUNG, LAFE, General Superintendent,
Laclede Steel Co.,
Alton, Illinois.

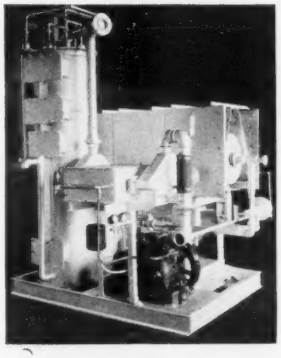
ZAPP, A. R., Manager Firthaloy Division,
Firth Sterling Steel Co.,
McKeesport, Pa.

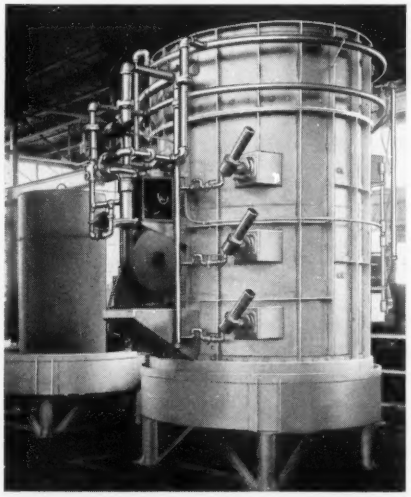
(*Please turn to page 540*)



SC FURNACES For HARDENING, ANNEALING, PATENTING, GALVANIZING

Whatever the heating operation, SC furnaces increase production, give better surface, better physical properties, dependable uniformity. You will want to obtain all these results, no matter what your heat treating operation or problem may be. Our engineers will be glad to consult with you.





Above is a standard Surface Combustion DX Gas Preparation Machine. DX Gas can be used in your present heat-treating equipment by simply providing a muffle for the work being treated. It can thus be used for bright annealing, deoxidizing and normalizing, bright hardening and tempering, and for many other processes requiring treatment in a controlled atmosphere.

Left: The bell type, controlled atmosphere annealing furnace anneals wire coils or coils of strip—clean, with uniformly high quality and with economy.

Write for descriptive bulletin on SC Furnaces.

Surface Combustion Corporation

SC TOLEDO, OHIO Sales and Engineering Service in Principal Cities

Also makers of.. ATMOSPHERE FURNACES... HARDENING, DRAWING, NORMALIZING ANNEALING FURNACES... FOR CONTINUOUS OR BATCH OPERATION

NEW MACHINE

To Reduce Labor Costs In Manufacturing

Lamp Cords

and other

Non Test Wire

✦ ✦ ✦

WE have developed an automatic size control which will detect variations in diameter while the wire is traveling thru any winding or coiling operation.

✦ ✦ ✦

Eliminates the necessity of the operator having to feel for LUMPS or bare spots.

✦ ✦ ✦

Allows speeding up of machines. One operator can run several machines.

✦ ✦ ✦

Other Products

"Davis" Sparkers

"Davis" Automatic Spark Testing System of Relays and Controls.

☆

R. L. Davis Elec. Co.

340 CENTER ST.

WALLINGFORD

CONN.

Amaloy

A New Lubricant for Finer Wires

MUCH has been done in the development in the drawing of stainless steel rod into the finer gauge wires. Many problems have confronted the manufacturers that were quite different than the drawing of carbon steel wires.

✦ ✦ ✦

PROBABLY no single problem confronted has been as serious as the finding of a suitable lubricant that will give a perfect lubrication between the wire and the drawing die. When a perfect lubricant is used, it will tend to retard the work hardening of the wire drawn and allow for a longer working life of the die.

* * *

SOAP, greases, oils and other compounds have been used much in the same manner as when drawing ordinary steel wires. When these compounds are used the life of lubricant and the wire is very limited. Most manufacturers using these type lubricants get only two or three passes through their dies before the wire requires annealing. The life of the drawing die is correspondingly short.

✦ ✦ ✦

AFTER several years of research and development, a more nearly perfect lubricant known as "Amaloy" was developed by the American Machine & Foundry Co. of New York.

✦ ✦ ✦

AMALOY is a lead lubricant composed of about 98% lead into which has been alloyed a bonding agent that will adhere to the base metal while drawn. Amaloy will flow with the elongation and reduction in diameter and acts as perfect lubricant between the wire and the dies.

✦ ✦ ✦

STANDARD practice in some of mills show that the rod from .250″ to .281″ diameter when cleaned and coated with Amaloy are drawn to .090 to .095 Dia. while one mill draws from .281″ Dia. to .068″ Dia. with no intermediate anneal whatever. The dies used being ordinary hardened steel dies.

✦ ✦ ✦

AFTER the wire reaches the work hardened stage, it is then re-annealed, cleaned, and recoated, and then drawn to the finished diameter as low as .025″ Dia. with no other annealing operation. Thus the 18-8 stainless steel rod is drawn to its finished diameter with two Amaloy coatings and one intermediate annealing operation. The life of the dies is increased from 100% to 300% and the work speeded through the plant.

✦ ✦ ✦

IT is said that Amaloy will not alone increase the life of dies, increase production and shorten up the delivery date, but will also reduce inventory of many slow-moving finished stock sizes.

✦ ✦ ✦

SEVERAL of the manufacturers using Amaloy draw their wire from .281 Dia. to .090″ Dia. anneal and then recoat with Amaloy. The recoated material is then drawn to .080″ Dia. or below and placed in stock with the coating still on. Upon receipt of order for a given size, this Amaloy coated wire is drawn from stock and run down to the finished diameter, since the lubricant does not and will not deteriorate in storage.

Attendance List
1935 Meeting

(*Continued from page 539*)

ZIMMERMAN, C. L., Quality Engineer, Western Electric Co., Chicago, Illinois.
ZOLLNER, K. A., Adv. Mgr., Wickwire Spencer Steel Co., New York, N. Y.
ZUCK, A. L., Technical Processing, Washburn Co., Rockford, Ill.

Order Your Copy of the

Wire Association Proceedings

✦ ✦ ✦

Limited Edition

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$5.00 Per Copy

The Wire Association

17 E. 42nd St., New York, N. Y.

Industrial Relations in the Wire Industry

(*Continued from page 523*)

ing arbitrary statements. Such statements are no longer the order of the day. People are seeking information and they want to know reasons and causes. It is most important to discuss cause and effect.

+ + +

Foremen Training Should Include Psychology

FOREMEN conference discussions should include fundamental economics and elementary industrial psychology. Of course these subjects must be put over in homeopathic doses so that the patient will not revolt with the mention of these sciences. It is a mystery why industrial managers hold their noses at the mention of psychology. Certainly no one factor is more important in present day relationships. It will be found that a foreman who gets along well with men, maintaining a high degree of morale, is a good practical psychologist. It is said that he understands human nature or that he knows how to get along with people. That's about all that can be expected of practical psychology, and if that knowledge and ability could be imparted to every supervisor there would be much less concern about industrial relations. Just so long as industry continues to ignore research into industrial psychology, and leaves the field entirely to theorists, and to union labor leaders, we shall continue to fail to give the proper kind of training to foremen and supervisors, and we shall continue to have misunderstandings between management and employes.

+ + +

Causes of Labor Difficulties

LABOR troubles seldom rise spontaneously nor do they often come from one single act of management. Of course it would be possible to create a strike situation because of some unreasonable or poorly thought-out decision of management, but such cases are exceptional. Labor difficulties usually arise from a slow accumulation of minor grievances or from the

(*Please turn to page 542*)

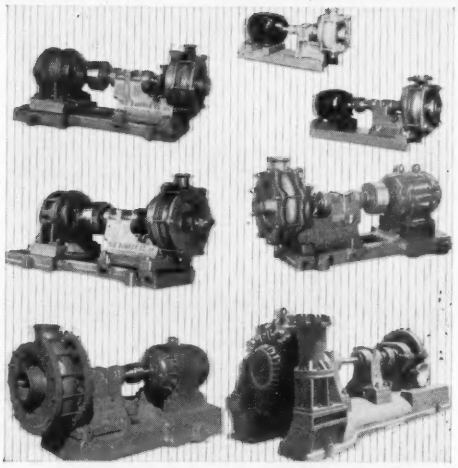
QUALITY DIAMOND DIES Since 1870

ENORMOUS STOCK OF FINE SIZE DIES
FOR
IMMEDIATE DELIVERY

Balloffet Diamond Wire Dies Co., Inc.

13-15 East 22nd Street
New York

Corrosion-Resisting Pumps



CORROSION - resisting centrifugal pumps made by The Duriron Company range in capacity from 5 g.p.m. to 2500 g.p.m., and for heads up to 120 ft. Particularly advantageous to Wire Mills for use with sulphuric and hydrochloric acids . . . for tank car unloading . . . in the Cleaning Room . . . for waste acid disposal and acid recovery systems.

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AMERICAN LIME AND STONE CO.

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KEYSTONE
Trained Men Look After Your Orders
Years of technical training, an understanding of your needs, a willingness to serve you, plus unvarying quality and uniformity, are responsible for more and more wire converters coming to Keystone for their requirements.
If you need galvanized, tinned, coppered finish, annealed (low, medium, high carbon) wire, spring wire, etc., Keystone furnishes it to your exact specifications.
And you can depend on it to be right—frequent laboratory tests, constant inspection assure it.
OK for uniformity ..quality

Manufacturers of wire for every purpose from paper clips to telephone lines.

Keystone Steel & Wire Co.

Peoria, Illinois

Industrial Relations in the Wire Industry

(*Continued from page 541*)

slow but sure propaganda of trouble makers. A real educational effort is the only answer to the latter, and this must not only include the giving of the right kind of information to supervisors, but it must include teaching how to use that information. It is not unusual that a supervisor gives the correct answer to a question but he gives it the wrong way. So far as accumulation of grievances is concerned, I like to quote Whiting Williams, who has said, upon this subject—"Industrial unrest comes from pin pricks—little acts of the immediate supervisor. Where there is real confidence in the immediate boss there is seldom labor trouble."

✦ ✦ ✦

NOT for the purpose of advocating military control in industry, but one cannot help compare a military movement and an industrial movement toward an objective. In a military movement every precaution is taken to assure, in advance, just as much as is humanly possible, that the movement will not fail because of lack of information or of cooperation. The time for going over the top is exactly set, watches are carefully compared to be certain that they agree, and everyone is given all of the necessary information so that the whole movement will take place as planned. When an industrial movement is planned, the men who are going to perform the most significant part of the movement often do not get essential information. Possibly one-third or even less get the original instructions. One-third get the instructions second-hand and incomplete while possibly one-third do not get them at all. With this kind of a set-up we cannot expect the essential cooperation toward the objective. It is upon just such a set-up as this that trouble makers depend. They feel, and with reason, that they can make false statements with little fear of successful contradiction, thus working upon the emotions of the workers.

Secure Your Employe's Confidence and Understanding

EDUCATION, training, explanation, building of confidence, building understanding always has been of importance in industry. Under present day circumstances this job is one of the most important that faces management. The rank and file of employes, through every supervisor, must be sold the idea that what is good for the company is good for employes, and conversely, what is good for employes is good for the company. It requires some analysis into this statement to grasp its full significance, but the statement is founded upon fact and its truth can be demonstrated. It must be sold in order to maintain good industrial relationships.

✦ ✦ ✦

How to Order Wire

(*Continued from page 525*)

lubricant or applied after drawing. This agent must effectively prevent rust and still not interfere with plating or spot welding operations. We trust the solution to this problem will be found in the near future.

✦ ✦ ✦

SEVERAL new items made of wire have recently been seen, which will increase the demand for wire. There are no doubt many unknown uses for wire and we should all be on the lookout for them because almost daily some item which has always been made of wire will hop out of the picture and then in its reincarnation, we find it made of steel in some other form.

✦ ✦ ✦

DRAWN wire can be made to many physical properties and chemical analyses required by different operations or finished products. Take advantage of the correct one of these each time you order wire. Complete information is your insurance.

✦ ✦ ✦

WHENEVER a trained wire sales representative calls upon you, he is offering you the resources and assistance of a highly specialized industry. He makes

(*Please turn to page 544*)

— DESCO —

A PICKLING STABILIZER ▲ ▲ ▲
FOR CARBON STEELS ▲ ▲ ▲

▲ ▲ ▲

The strong passivating effect of this excellent inhibitor insures a bright finish and forms a sound basis for a bright drawing technique—

▲ ▲ ▲

DELANY CHEMICAL CO.

COTTMAN AND MILNOR STS.,
PHILADELPHIA, PA.

Learn about PARALAN

Paralan will give your finished wire and wire products protection from atmospheric corrosion in the mill and in shipping. Paralan-coated wire can be spot welded or soldered without cleaning. Also, Paralan leaves surfaces in good condition for all types of finishes—enameling, japanning, lacquering, plating, etc.

Write for further information. We may be able to solve your difficulties.

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LAWRENCE, MASSACHUSETTS

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REG. U. S. PAT. OFFICE
For High or Low Carbon Wire
WIRE DRAWING SOAPS

Established 30 years

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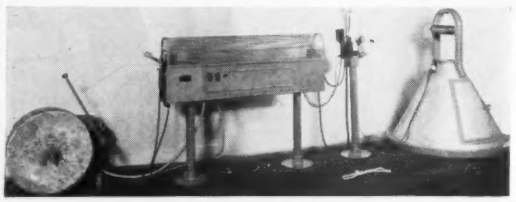
To those attending the meetings and paying the registration fee, copies are available at $2.50 each.

The Wire Association
17 E. 42nd St., New York, N. Y.



This machine will
1—Depan rubber covered wire after vulcanization,
2—Stop automatically if wire tangles when leaving pan,
3—Measure total length of wire and, if desired, stop on reaching any predetermined length as measured by an auxiliary dial,
4—Check diameter of covered wire for over or under size insulation, stopping automatically in either case,
5—Spark test rubber insulation for faults,
6—Wind the wire on a reel on a motor driven reel stand.

Automatic depanning, wire measuring, spark testing and reeling outfit—combines many operations — saves time and labor cost.

(Patent applied for)

EST. 1885 AIMCo INC. 1915
"American" INSULATING MACHINERY COMPANY
REG. U.S. PAT. OFF.
517 West Huntingdon St.
PHILADELPHIA PENNSYLVANIA USA

Premier
TRADE MARK REG. U.S. PAT. OFF.
Diamond Dies

Reduce Rejects
Give Better Finish
Hold To Size Longer
Cast Straight On Block

DRIVER-HARRIS COMPANY
HARRISON · NEW JERSEY

Three Wire Nail Factories in Monterrey

THERE are three wire nail factories in Monterrey, **Mexico,** all equipped with American machinery and having a capacity of 300 tons per month. The wires are obtained from the Monterrey Iron and Steel Works and the plants in question are now operating at about 60 percent of capacity.

Wire Drawing Diamond Dies

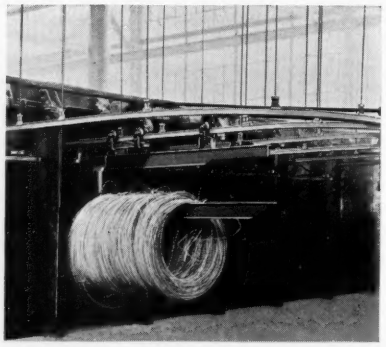
COCHAUD
WIRE DIE CORPORATION
300 W. 56th ST., NEW YORK
Tel. Col. 5-1340

Material Handling of Rods And Wire

(*Continued from page 517*)

conveying his finished product to skids.

✦ ✦ ✦



No. 7. Loads are switched and then automatically enter the desired alley of the baker. ✦ ✦

In conclusion, it may be stated that what may be applicable in this lecture to one plant may not be practicable in the present set-up of another for very logical reasons. It resolves itself into a careful calculation of engineering adaptability of each respective plant, bearing in mind costs and savings.

✦ ✦ ✦

I WISH to express my thanks and appreciation to the President of Sheffield Steel Corporation, Mr. Ralph L. Gray, for granting me permission for my procedures, as well as Cleveland Tramrail Company for preparing the stereopticon slides of this lecture.

✦ ✦ ✦

How to Order Wire

(*Continued from page 543*)

and files notes regarding the details of the call. Needless to say, if the important details and consumers problems are brought out during his visit, the producer will have a better idea of how the wire is used and this can only result in greater mutual satisfaction, both in production and fabricating of wire and wire products.

WIRE MILL EQUIPMENT
MORGAN CONSTRUCTION CO.
WORCESTER, MASS.

'Round the World With the Wire Industry

(*Continued from page 533*)

THE German wire rope industry reports that the industry is operating at present at 68% of capacity. The export trade continues to yield record figures and the monthly export figure is now reaching 1300 tons monthly, in spite of keen competition. The improvement is chiefly due to barter business. Japan, a competitor herself is nevertheless buying the better qualities, and Russia, which was out of the market for some time, is now reentering the business.

✦ ✦ ✦

German Wire Rod Exports

WIRE rods are the only product on which the export trade is very low, only 1440 tons were exported in July and 1780 tons in August. This is due to the exhaustion of allotments, but it seems that the German makers will now follow the example of the other cartels and try to exclude business on barter from general export quotas and so be able to book export orders once more.

✦ ✦ ✦

Barter for Wire

BARTER business with Latin America continues to be very active. Exports of wire to Latin America were up during the first eight months of this year compared with 1934, by almost 55%. Among recent contracts is one for 10,000 tons of Yucatan (Mexico) rice against wire, bolts and other steel products; 1200 tons of copper from Chile against wire, etc., 25,000 bales of cotton from Peru against wire, hoops, sheets, etc., and 6,000 bushels of bananas from Costa Rica against wire. Barter transactions with Californian customers continue to be numerous. German importers have just contracted for $180,000 worth of dried fruits and oranges, lemons and nuts from California against barbed wire, wire nails, wire rope and hoops, and another contract was placed for $140,000 worth of pineapples

(*Please turn to page 546*)

Patents—Trade Marks

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100% INHIBITOR

The Only Inhibitor Not Diluted

Adopted by 30 Companies

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Chemical Engineers

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Actively in Steel since 1860

EFFICIENT PICKLING

Assured With

RODINE

Rodine saves acid and metal, prevents acid brittleness, and reduces acid fumes.

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With

FLYING SHEAR

for round and shaped wire.

✦ ✦ ✦

THE HALLDEN MACHINE COMPANY

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Roll and Rotary Wire Straighteners

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Wire Mill Superintendent
Desires new connection

Many years experience in the drawing of steel wire of all kinds including a special knowledge of drawing Spring wire and fine wires

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FOLDED PAPER FLATS
PAPER INSULATION YARNS
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Formerly National Patent Reed Co.
3rd & Somerset Sts. Phila., Pa.

TUNGSTEN, DIAMOND, TANTALUM
DIES
KELLY
WIRE DIE CORPORATION
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WANTED
Mechanical engineer experienced in wire machinery design. Age 30 to 40. To supervise, design and check shop details. Familiar with shop practice. Location near New York.
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Wire Mill and Cold Rolling Equipment
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CLEVELAND, OHIO

WANTED
Wire Mill Designer, Chicago District, capable of designing and detailing wire cleaning, wire drawing, patenting and galvanizing equipment, etc., and assisting in general lay out of complete wire mill installations. In reply give references, experience, and salary expected. Address reply to Box 600,
c/o WIRE AND WIRE PRODUCTS
17 East 42nd St. New York, N. Y.

New Products Development Corp.
Consulting and Research Engineers
Specializing in developing new wire products, manufacture of wire, insulated wire and high tension cable.
Standard and special equipments developed, built and installed. Any problem you may have, we solve it if you consult us.
Phone: Yonkers 3727
20 So. Broadway, Yonkers, N. Y.

'Round the World With the Wire Industry

(*Continued from page 545*)

and pineapple conserves from Hawaii and California also chiefly against same type of wire and piano wire.

✦ ✦ ✦

AS the Belgian steel cartel has been trusted by the Government with the sole control right for steel export, the outsiders find it difficult to compete, and wire rod exports from outsiders have come entirely to an end.

✦ ✦ ✦

NOW that Poland is a member of the IWECO and an agreement has been signed with the British wire netting industry, reports are favorable, that the negotiations will be closed the end of this month, ending with the acceptance of the Swedish wire nail industry in the cartel. Swedish exports have gained greatly since the devaluation of the Kroner and are now close to 5000 tons a year.

RUESCH
Machinery For
Wire, Tube, And Brass Mills
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Subsidiary of
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TUNGSTEN CARBIDE DIES
For Wire, Rod and Tubing
Round and Special Shapes
TUNGSTEN ELECTRIC CORP.
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Cleveland
Cincinnati Chicago Philadelphia

ZINC STRIP AND WIRE
THE PLATT BROS. & CO.
WATERBURY, CONN.

VIANNEY
Safety First—Guaranteed weights cost no more than unguaranteed weights.
DIES for SCREEN WIRE

SCHUMAG
ROD MAKING,
STRAIGHTENING AND POLISHING MACHINES
W. A. SCHUYLER
FISK BLDG. NEW YORK

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Sleeper & Hartley, Inc., Worcester, Mass.
Watson Machine Co., Paterson, N. J.

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Morgan Construction Co., Worcester, Mass.
Morrison Engineering Co., Cleveland, O.
Vaughn Machinery Co., Cuyahoga Falls, O.

BORON CARBIDE—
Norton Co., Worcester, Mass.

CEMENTS—Refractory
Norton Co., Worcester, Mass.

CHEMICALS—Cleaning
American Chemical Paint Co., Ambler, Pa.
American Machine & Foundry Co., Amaloy Div., Brooklyn, N. Y.
Delany Chemical Co., Tacony Station, Philadelph'a, Pa.
Parkin Co., The Wm., Pittsburg, Pa.

CLEANING & PICKLING EQUIPMENT
Broden Construction Co., Cleveland, O.
Duriron Co., The, Dayton, O.
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

COATING—Protective
American Lanolin Corp., Lawrence, Mass.

COILERS—Sheet, Strip and Wire
Borden Construction Co., Cleveland, O.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
H. J. Ruesch Machine Co., Newark, N. J.

CONDUITS—Iron and Steel
Youngstown Sheet & Tube Co., Youngstown, Ohio.

CRANES—Wire Mill
Cleveland Electric Tramrail Div., of Cleveland Crane & Eng. Co., Cleveland, O.
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

DIES—Diamond
Balloffet Diamond Wire Dies Co., Inc., N. Y. C.
Cochaud Wire Die Co., New York.
Driver-Harris Co., Harrison, N. J.
Kelly Wire Die Corp., New York, N. Y.
Union Wire Die Corp., New York, N. Y.
Vianney Wire Die Works, New York.

DIES—Lead Extrusion
John Robertson Co., Brooklyn, N. Y.

DIES—Repairs & Re-Cutting
Cochaud Wire Die Corp., New York.
Driver-Harris Co., Harrison, N. J.
Firth-Sterling Steel Co., McKeesport, Pa.
Kelly Wire Die Corp., New York, N. Y
Union Wire Die Corp., New York, N. Y.
Vianney Wire Die Wks., N. Y.

DIES—Rod and Tube Drawing
Bissett Steel Co., Div. of Tungsten Electric Co., Cleveland, O.
Carboloy Co., Inc., Newark, N. J.
Firth-Sterling Steel Co., McKeesport, Pa.
Kelly Wire Die Corp., New York, N. Y.
Union Wire Die Corp., New York, N. Y.
Vianney Wire Die Works, New York, N. Y.

DIES—Tantalum Carbide
Bissett Steel Co., Div. of Tungsten Electric Co., Cleveland, O.
Kelly Wire Die Corp., New York, N. Y.
Vianney Wire Die Works, New York, N. Y.

DIES—Tungsten Carbide
Bissett Steel Co., Div. of Tungsten Electric Corp., Cleveland, O.
Carboloy Co., Inc., Newark, N. J.
Driver-Harris Co., Harrison, N. J.
Firth-Sterling Steel Co., McKeesport, Pa.
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Union Wire Die Corp., New York, N. Y.
Vianney Wire Die Works, New York, N. Y.

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Vaughn Machinery Co., Cuyahoga Falls, O.

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ENGINEER—Consulting Wire Mill
Lewis, Kenneth B., New York, N. Y.

ENGINEERS—CONSULTING—Non-ferrous Wire Mill
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Surface Combustion Co., Toledo, O.

FURNACES—Automatic
Electric Furnace Co., Salem, O.
Surface Combustion Co., Toledo, O.

FURNACES—Bright Annealing
Electric Furnace Co., Salem, O.
Surface Combustion Co., Toledo, O.

FURNACES—Electric
Electric Furnace Co., Salem, O.
Surface Combustion Co., Toledo, O.

FURNACES—Lead Melting
Electric Furnace Co., Salem, O.
John Robertson Co., Brooklyn, N. Y.
Surface Combustion Co., Toledo, O.

FURNACES—Non-Oxidizing
Electric Furnace Co., Salem, O.
Surface Combustion Co., Toledo, O.

FURNACES—Wire, Strip and Sheet
Electric Furnace Co., Salem, O.
Surface Combustion Co., Toledo, O.

GEARS—Wire Mill
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Lewis Foundry & Machine Co., Pittsburgh, Pa.

GRINDERS—Roll
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Norton Co., Worcester, Mass.

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INHIBITORS
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Delany Chemical Co., Tacony Station, Philadelphia, Pa.
Parkin Co., The Wm., Pittsburgh, Pa.

INSULATION—Cable or Cable Filler
E. W. Twitchell, Inc., Phila., Pa.

LATHES—Die Reaming
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

LIME—Pulverized
Amer. Lime & Stone Co., Bellefonte, Pa.

LUBRICANTS—Wire Drawing
American Machine & Foundry Co., Amaloy Div., Brooklyn, N. Y.
R. H. Miller Co., Homer, N. Y.
J. T. Robertson & Co., Syracuse, N. Y.

MACHINERY—Armoring (Cable, Wire Hose)
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
John Robertson Co., Brooklyn, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Thomson-Gibb Electric Welding Co., Lynn, Mass.
Watson Machine Co., Paterson, N. J.

MACHINERY—Braiding
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Brazing
Thomson-Judd Wire Machinery Co., Lynn, Mass.

MACHINERY—Bunching
Amer. Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Watson Machine Co., Paterson, N. J.

MACHINERY—Bundling, Scrap
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
Watson Machine Co., Paterson, N. J.

MACHINERY—Cable, Electric
American Insulating Machinery Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Thomson-Gibb Electric Welding Co., Lynn, Mass.
Watson Machine Company, Paterson, N. J.

MACHINERY—Chain Making
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Closing
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Coil Winding
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Coilers
Broden Const. Co., Cleveland, O.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Morgan Const. Co., Worcester, Mass.
H. J. Ruesch Machine Co., Newark, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.
Watson Machine Co., Paterson, N. J.

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Farrel-Birmingham Co., Inc., Ansonia, Conn.
H. J. Ruesch Machine Co., Newark, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.

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Broden Construction Co., Cleveland, O.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Hallden Machine Co., Thomaston, Conn.
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MACHINERY—Enameling
American Insulating Mach'y Co., Phila., Pa

MACHINERY—Extruding
John Robertson Co., Brooklyn, N. Y.
Watson Machine Co., Paterson, N. J.

MACHINERY—Flat Wire
Broden Construction Co., Cleveland, O.
H. J. Ruesch Machine Co., Newark, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Forming
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Galvanizing Wire
Broden Construction Co., Cleveland, O.
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Gang Winders
H. J. Ruesch Machine Co., Newark, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Grinding
Norton Co., Worcester, Mass.

MACHINERY—Insulating
American Insulating Machinery Co., Phila.
New England Butt Co., Providence, R. I.
Syncro Machine Co., Newark, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Lead Encasing Presses, etc.
John Robertson Co., Brooklyn, N. Y.

MACHINERY—Lead Stripping
John Robertson Co., Brooklyn, N. Y.
Watson Machine Co., Paterson, N. J.

MACHINERY—Lock Washer
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Magnet Wire
American Insulating Mach'y Co., Phila., Pa.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Material Handling
Cleveland Electric Tramrail Div. of Cleveland Crane & Engineering Co., Wickliffe, Ohio.

MACHINERY—Measuring Wire & Cable
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Nail and Tack
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Panning
American Insulating Machinery Co., Phila.

MACHINERY—Pointing
Broden Construction Co., Cleveland, O.
H. J. Ruesch Machine Co., Newark, N. J.
E. J. Scudder Foundry & Machine Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.

BUYERS' GUIDE, Continued

MACHINERY—Rod Mill
Broden Construction Co., Cleveland, O.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Lewis F'dry & Machine Co., Pittsburgh, Pa.
Morgan Const. Co., Worcester, Mass.
H. J. Ruesch Machine Co., Newark, N. J.
W. A. Schuyler, New York, N. Y.

MACHINERY—Rolling Mill
Broden Construction Co., Cleveland, O.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Lewis F'dry & Machine Co., Pittsburgh, Pa.
Morgan Construction Co., Worcester, Mass.
H. J. Ruesch Machine Co., Newark, N. J.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.

MACHINERY—Rubber Strip Covering
Farrel-Birmingham Co., Inc., Ansonia, Conn.
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Rubber Tubing and Straining
Farrel-Birmingham Co., Inc., Ansonia, Conn.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Watson Machine Co., Paterson, N. J.

MACHINERY—Screw Wire
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Special
American Insulating Mach'y Co., Phila. Pa.
Broden Construction Co., Cleveland, O.
H. J. Ruesch Machine Co., Newark, N. J.
E. J. Scudder Foundry and Machine Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Watson Machine Co., Paterson, N. J.

MACHINERY—Special—Combination Machine for Drawing, Cutting-to-length, Straightening and Reeling Bars from Coil in One Operation (Shumag Type)—
W. A. Schuyler, New York, N. Y.

MACHINERY—Spooling
American Insulating Machinery Co., Phila.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Spring Making
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Staple
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Straightening
Broden Construction Co., Cleveland, O.
Hallden Machine Co., Thomaston, Conn.
H. J. Ruesch Machine Co., Newark, N. J.
W. A. Schuyler, New York, N. Y.
F. B. Shuster, New Haven, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Stranding
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Thomson-Judd Wire Machinery Co., Lynn, Mass.
Watson Machine Co., Paterson, N. J.

MACHINERY—Strip Steel
Broden Const. Co., Cleveland, O.
Lewis F'dry & Machine Co., Pittsburgh, Pa.
H. J. Ruesch Machine Co., Newark, N. J.

MACHINERY—Swaging
H. J. Ruesch Machine Co., Newark, N. J.
Sleeper & Hartley, Worcester, Mass.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.

MACHINERY—Taping
Amer. Insulating Mach. Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Thomson-Judd Wire Machinery Co., Lynn, Mass.
Watson Machine Co., Paterson, N. J.

MACHINERY—Testing Size of Wire
R. L. Davis Elec. Co., Wallingford, Conn.

MACHINERY—Tinsel Rolling Mills
Amer. Insulating Mach'y Co., Phila., Pa.

MACHINERY—Trolley Wire
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Tube Mill
H. J. Ruesch Machine Co., Newark, N. J.

MACHINERY—Welding Wire
Micro Products Co., Chicago, Ill.
F. B. Shuster Co., New Haven, Conn.
Thomson-Judd Wire Machinery Co., Lynn, Mass.

MACHINERY—Winding
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Watson Machine Co., Paterson, N. J.

MACHINERY—Wire Drawing
American Insulating Machinery Co., Phila.
Broden Const. Co., Cleveland, Ohio.
Morgan Construction Co., Worcester, Mass.
H. J. Ruesch Machine Co., Newark, N. J.
E. J. Scudder Foundry & Machine Co., Trenton, N. J.
W. A. Schuyler, New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Thomson-Judd Wire Machinery Co., Lynn, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.

MACHINERY—Wire Rope
New England Butt Co., Providence, R. I.
Thomson-Judd Wire Machinery Co., Lynn, Mass.
Watson Machine Company, Paterson, N. J.

MACHINERY—Wire Tinning
American Insulating Mach'y Co., Phila., Pa.

MACHINERY—Wrapping Wire
W. A. Schuyler, New York, N. Y.

MATERIAL HANDLING EQUIPMENT—
Cleveland Electric Tramrail Div., of Cleveland Crane & Eng. Co., Cleveland, O.

PAPER—Insulating
E. W. Twitchell, Inc., Phila., Pa.

PICKLING COMPOUNDS—
American Chemical Paint Co., Ambler, Pa.
Delany Chemical Co., Tacony Station, Philadelphia, Pa.
Parkin Co., The Wm., Pittsburgh, Pa.

POTS—Lead Melting
John Robertson Co., Brooklyn, N. Y.

PRESSES—Hydraulic and Mechanical
Farrel-Birmingham Co., Inc., Ansonia, Conn.
John Robertson Co., Brooklyn, N. Y.

PRESSES—Lead Encasing
Farrel-Birmingham Co., Ansonia, Conn.
John Robertson Co., Brooklyn, N. Y.

PRESSES—Lead Extrusion
Farrel-Birmingham Co., Ansonia, Conn.
John Robertson Co., Brooklyn, N. Y.

PULLERS—Wire
E. J. Scudder Fdry. & Machine Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.

PUMPS—Hydraulic
John Robertson Co., Brooklyn, N. Y.

REEL AND TENSION STAND—
Sleeper & Hartley, Inc., Worcester, Mass.

REEL CRUTCHES
Watson Machine Co., Paterson, N. J.

REFRACTORIES—High Temperature
Norton Co., Worcester, Mass.

ROD BAKERS—
Morrison Engineering Co., Cleveland, O.

RODS—Wire—Non Ferrous
Hudson Wire Co., Ossining, N. Y.
Platt Bros. & Co., The, Waterbury, Conn.
Seymour Mfg. Co., Seymour, Conn.

RODS—Wire—Steel
Continental Steel Corp., Kokomo, Ind.
Keystone Steel & Wire Co., Peoria, Ill.
Republic Steel Co., Youngstown, O.
Wheeling Steel Corp., Wheeling, W. Va.
Youngstown Sheet & Tube Co., Youngstown, Ohio.

ROLLING MILLS—See Machinery—Rolling Mill

ROLLS—
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Lewis F'dry & Machine Co., Pittsburgh, Pa.

RUST PROOF COMPOUND
American Lanolin Co., Lawrence, Mass.

SHEET—Steel
Continental Steel Corp., Kokomo, Ind.
Republic Steel Co., Youngstown, O.
Superior Sheet Steel Co., Canton, O.
Wheeling Steel Corp., Wheeling, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

SOAPS—Wire Drawing
R. H. Miller Co., Homer, N. Y.
J. T. Robertson & Co., Syracuse, N. Y.

STRIP—Brass, Zinc and Non Ferrous
Hudson Wire Co., Ossining, N. Y.
Platt Bros. & Co., The, Waterbury, Conn.
Seymour Mfg. Co., Seymour, Conn.

STRIP—Steel
Continental Steel Corp., Kokomo, Ind.
Firth-Sterling Steel Co., McKeesport, Pa.
Republic Steel Co., Youngstown, O.
Wheeling Steel Corp., Wheeling, W. Va.

TANKS—Compound
Watson Machine Co., Paterson, N. J.

TREADS—Safety
Norton Co., Worcester, Mass.

TRUCKS
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

TUBE BENDERS AND FORMERS
H. J. Ruesch Machine Co., Newark, N. J.

VALVES AND FITTINGS—Acid Proof
Duriron Co., The, Dayton, O.

VULCANIZERS
Watson Machine Co., Paterson, N. J.

VULCANIZING PANS
American Insulating Mach'y Co., Phila., Pa.

WIRE—Cold Heading
Continental Steel Corp., Kokomo, Ind.
Keystone Steel & Wire Co., Peoria, Ill.
Republic Steel Corp., Youngstown, O.
Youngstown Sheet & Tube Co., Youngstown, O.
Wheeling Steel Corp., Wheeling, W. Va.

WIRE—Electric
Hudson Wire Co., Ossining, N. Y.

WIRE—Enameled For Coils
Winsted Div. of Hudson Wire Co., Winsted, Conn.

WIRE—Manufacturers
Continental Steel Co., Kokomo, Ind.
Keystone Steel & Wire Co., Peoria, Ill.
Republic Steel Co., Youngstown, O.
Wheeling Steel Corp., Wheeling, W. Va.
Youngstown Sheet & Tube Co., Youngstown, Ohio

WIRE—Nickel Silver and Phosphor Bronze
Hudson Wire Company, Ossining, N. Y.

WIRE—Non Ferrous to Specification For Special Purposes
Hudson Wire Co., Ossining, N. Y.
Winsted Div. of Hudson Wire Co., Winsted, Conn.

WIRE—Spring
Continental Steel Corp., Kokomo, Ind.
Keystone Steel and Wire Co., Peoria, Ill.
Republic Steel Co., Youngstown, O.
Youngstown Sheet & Tube Co., Youngstown, Ohio.

WIRE—Steel—Also Coppered Steel—Also Galvanized Steel
Continental Steel Corp., Kokomo, Ind.
Keystone Steel & Wire Co., Peoria, Ill.
Republic Steel Co., Youngstown, O.
Wheeling Steel Corp., Wheeling, W. Va.
Youngstown Sheet & Tube Co., Youngstown, Ohio.

WIRE AND STRIP—Brass, Zinc
Platt Bros. & Co., The, Waterbury, Conn.

This is a carefully classified index of concerns who specialize in this industry and who advertise regularly in WIRE & WIRE PRODUCTS. Please mention WIRE when writing to these firms.

THE WATSON MACHINE COMPANY

ESTABLISHED 1845

PATERSON, NEW JERSEY, U. S. A.

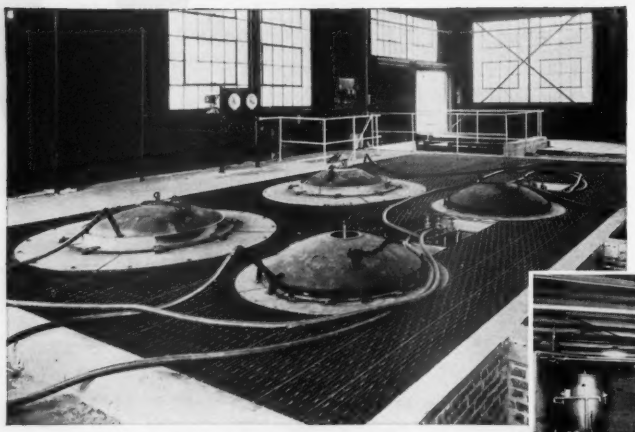
Electric Cable and Wire Rope Machinery:

STRANDERS	Planetary & Rigid Frame types (*horizontal and vertical.*) High-Speed Tubular and Built-up types.
BUNCHERS	High-speed types for spools up to 1500 lb. capacity.
ARMORING MACHINES	For Wire (*planetary type*) and for Tape.
PAIRING & TRIPLING MACHINES	For Bare & Insulated Wire.
CLOSERS	For Wire in Planetary, High-speed & Angular types.
CLOSERS & CABLERS	For electric cable in Planetary and Angular types.
TAPING MACHINES	Eccentric and Concentric types, for Paper, Friction and Varnished Cambric and Burlap types.
TAPING HEADS	For applying steel tape in Eccentric and Concentric high-speed types.
JUTE & BURLAP	Applying Heads.
THREAD SERVERS	For Cotton, Asbestos, etc. application on hose and wire.
COMPOUND TANKS	Electrical or Steam heated for machine or unit application.
CHALK APPLIERS	Wet and Dry types.
CAPSTAN SECTIONS	With Single tapered and double grooved wheels, with Lay Control by gears or variable speed transmission.
LET OFF REEL STANDS	Shaft and Shaftless types, for any size of reels.
WINDERS	For steel and copper, in single or multiple head units.
COILING MACHINES	Power or manual drive for package coiling—also for warehouse and shipping room use.
COILING HEADS	For wire rope and insulated wire and cable.
TAKEUP STANDS	Inclined frame, Shaftless and Heavy-duty types.
TRAVERSES	Light and Heavy, manual, mechanical and motorized.
TEMPERING & GALVANIZING MULTIPLE HEAD TAKEUPS	For wire.
MEASURING MACHINES	For Length Measurement.
ELECTRIC PATCH VULCANIZERS	
SATURATING, WAXING & GREASING TANKS	Gas fired and Electrical.
WIRE TINNING MACHINES	Gas fired and Electrical.
CABLE PEELERS	For removing lead sheathing and insulation.
POLISHING HEADS	Separately or Motor driven.
REEL CRUTCHES	For turning heavy reels in handling and shipment.
MOTORIZED WINCHES	For general duty in cable and rope plants.
CUTTERS	For wire rope, cable and chain.
SPOOLS	Heavy-duty for Rope-Mills and Cable-plants.

Send for descriptive catalogue.

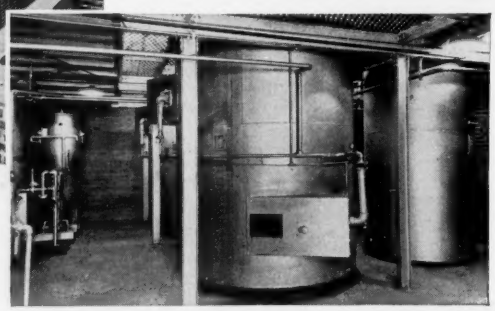
ELECTRICAL WIRE AND CABLE—WIRE ROPE AND CORDAGE MACHINERY

Wire Annealing Furnaces



Above—A recent gas-fired furnace installation for annealing low carbon steel wire in coils—similar installations for normalizing and spheroidizing rod, bright annealing wire, etc.

Below—The Elfurno gas generator shown at left of the picture below provides the special atmosphere used in the furnaces shown at right for bright annealing steel wire in coils.



Advantages and Savings.

The Electric Furnace Co.'s new pit type furnaces—similar to the installation above—have shown the following advantages: Increased tonnage per pit. Improved fuel economy. More uniformly annealed wire. Improved surface condition. Lower maintenance cost. Decreased annealing time and labor requirements. Maximum flexibility—produce a bright surface, semi-bright or otherwise as desired.

Several Installations Made.

Several similar installations have already been made for normalizing and spheroidizing rod; and arranged for controlled atmosphere for bright and clean annealing wire.

Other Outstanding Installations.

We have also made a number of other outstanding continuous and semi-continuous installations for annealing brass, bronze and copper wire, rod and bars.

Two More Being Installed.

Two more continuous type, controlled atmosphere furnaces for bright and clean annealing wire are now being installed in prominent plants.

We specialize on building electric and fuel-fired furnaces and time and labor saving auxiliary equipment to fit the customer's specific requirements. We would like to work with you on any of your furnace or heat treating problems.

The Electric Furnace Co., Salem, O.

Head Office and Works of The Electric Furnace Company, Salem, Ohio . . . located on the main line of the P. R. R. . . . the largest plant in the country devoted exclusively to designing and building electric and fuel-fired industrial furnaces and auxiliary equipment.